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EX-MERIDIAN
ALTITUDE TABLES

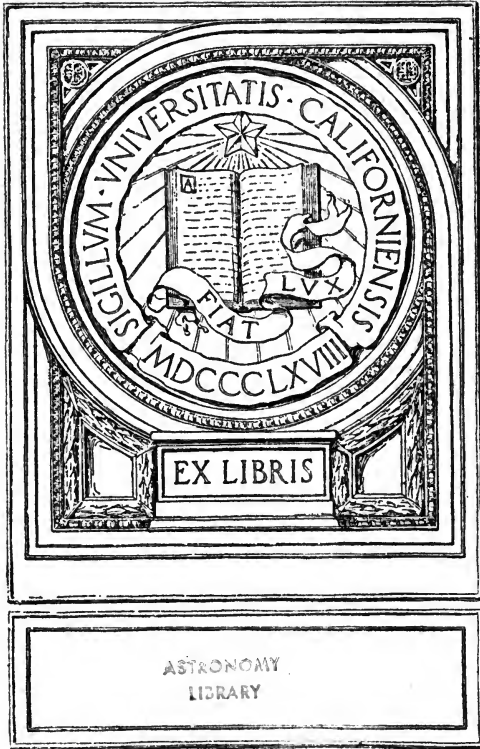
DECLINATION (0° — 70°)

TO WHICH IS ADDED AN EXPLANATION OF

MAXIMUM & MINIMUM ALTITUDE

AND OTHER PROBLEMS.

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EX-MERIDIAN ALTITUDE TABLES

DECLINATION (0° – 70°)

TO WHICH IS ADDED AN EXPLANATION OF

MAXIMUM AND MINIMUM ALTITUDE,
LONGITUDE AS WELL AS LATITUDE FROM TWO
OBSERVATIONS OF A HEAVENLY BODY WHEN
NEAR AND ON OPPOSITE SIDES OF
THE MERIDIAN.

ALSO

A SOLUTION OF THE NEW NAVIGATION METHOD

BY

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SEVENTH EDITION

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PREFACE TO SEVENTH EDITION.

SINCE the publication of the Ex-Meridian Altitude Tables, the authors have received a large number of communications from officers who have used the Tables under almost every condition of time and other circumstances, all testifying in the most unqualified manner as to their practical utility, both in giving excellent results and in saving the labour of calculation, often a matter of consideration to the navigator. This gratifying reception of the book has proved an incentive to the publishing of a new edition.

April, 1914.

THE

EX-MERIDIAN ALTITUDE PROBLEM;

WITH EXPLANATION AND USE OF TABLES.

It often happens that, although an observation of a celestial body can be well taken a few minutes before or after its meridian passage, it may be totally obscured by clouds when on the meridian.

Hence, to secure the latitude from an altitude *near* the meridian is of the highest importance.

The great practical value of the Ex-meridian problem can scarcely be over estimated in these days of quick passages.

Captain Lecky, in his valuable work entitled "Wrinkles in Practical Navigation," says, "In addition to the extreme simplicity of the Ex-meridian problem, it has this to recommend it,—that neither is the "patience taxed, the eye fatigued, nor the instrument unnecessarily "exposed by the usual weary waiting for the meridian altitude."

. "Another point wherein the Ex-meridian altitude has "a pull over the altitude *on* the meridian, is, that during twilight (the "best time for observing) it may so happen that there is no star then "culminating; whereas it would be hard lines indeed if one or two "could not be found, whose hour-angle east or west permitted the use of "this method."

The method for deducing the latitude from observations near the meridian, exhibited in this work, is one of great precision, and is applicable with equal facility to observations of all heavenly bodies.

In the spherical triangle formed by the elevated pole, the zenith of the observer, and the celestial body, let

h be the easterly or westerly hour-angle.

p the polar distance, supposed to remain constant while the celestial body describes the angle *h*.

c the co-latitude of the observer.

*z*₁ the zenith distance of the celestial body, and

z the zenith distance, when on the meridian of the observer.

Then for the superior meridian we have

$$z = p \vee c.$$

$$\text{Cos. } z = \text{Cos. } p. \quad \text{Cos. } c + \text{Sin. } p. \quad \text{Sin. } c.$$

$$\text{Cos. } z_1 = \text{Cos. } p. \quad \text{Cos. } c + \text{Sin. } p. \quad \text{Sin. } c. \quad \text{Cos. } h.$$

By subtraction—

$$\text{Cos. } z - \text{Cos. } z_1 = \text{Sin. } p. \text{ Sin. } c (1 - \text{Cos. } h).$$

$$2. \text{Sin. } \frac{1}{2} (z_1 - z) = \frac{2. \text{Sin. } p. \text{ Sin. } c}{\text{Sin. } \frac{1}{2} (z_1 + z)} \text{Sin. }^2 \frac{h}{2}$$

Now, the observation being made when the celestial body is near the meridian, $\frac{1}{2} (z_1 - z)$ and h are small; thus, expressing the former in seconds of arc and the latter in minutes of time, we may write—

$$(z_1 - z) \text{Sin. } 1'' = \frac{2. \text{Cos. } dec. \text{ Cos. } lat.}{\text{Sin. } \frac{1}{2} (z_1 + z)} \left(\frac{h}{2} \text{Sin. } 15' \right)^2$$

Also we may for $\text{Sin. } \frac{1}{2} (z_1 + z)$ substitute $\text{Sin. } z$, or $\text{Sin. } (lat. \mp dec.)$

$$z_1 - z = \frac{\text{Cos. } dec. \text{ Cos. } lat. \text{ Sin. }^2 15'}{2. \text{Sin. } (lat. \mp dec.)} h^2$$

If we represent the co-efficient of h^2 by C we have

$$z_1 - z = C. h^2$$

$$\text{or} \quad z = z_1 - C. h^2$$

For the inferior meridian we have

$$z = p + c.$$

$$\text{Cos. } z = \text{Cos. } p. \text{ Cos. } c - \text{Sin. } p. \text{ Sin. } c.$$

$$\text{Cos. } z_1 = \text{Cos. } p. \text{ Cos. } c - \text{Sin. } p. \text{ Sin. } c. \text{Cos. } \overline{\pi - h}.$$

By subtraction—

$$\text{Cos. } z_1 - \text{Cos. } z = \text{Sin. } p. \text{ Sin. } c. (1 - \text{Cos. } \overline{\pi - h}).$$

Thence as before—

$$z - z_1 = \frac{\text{Cos. } dec. \text{ Cos. } lat. \text{ Sin. }^2 15'}{2. \text{Sin. } (lat. + dec.)} \frac{\overline{\pi - h}^2}{\text{Sin. } 1''}$$

$$\text{and} \quad z - z_1 = C. \overline{\pi - h}^2$$

$$\text{or} \quad z = z_1 + C. \overline{\pi - h}^2$$

Table I. gives the corrections to be applied to observed altitudes of the sun's lower limb, and of the stars, involving for the sun—*dip—refraction—mean semidiameter 16'—and parallax*; for the stars—*dip and refraction*.

Table II. indicates the intervals of time before and after the meridian passage of the celestial body, during which observations may be taken.

Table III. contains the value of C , which is the change in altitude during the minute preceding or succeeding the meridian transit.

When the altitude is taken near the inferior meridian, the value of C will be found in that part of Table III. where the declination is of a *contrary name* to the latitude.

C is tabulated for the correct latitude. In practice the navigator would use his dead reckoning latitude as an argument to find C , and generally that will be sufficient. Should the latitude obtained from the

observation differ considerably from the dead reckoning one, re-enter the table for another value of C and re-work the observation.

Table IV. gives the product of C and h^2 or C and $\overline{\pi - h}^2$. This product is to be *added* to the altitude of the body when the observation is taken near the superior meridian—otherwise—*subtracted* from the altitude, or, which is the same thing in the end, *added* to the declination.

Table V. gives the approximate apparent time of the meridian passage of the principal fixed stars at the superior transit. By adding or subtracting 12 hours to these times we can obtain with sufficient accuracy the meridian passage at the inferior transit. This Table, in conjunction with Table II., will enable the navigator to select suitable stars for an ex-meridian observation during twilight.

The following Examples, taken on board H. M. S. "Orlando," will illustrate and explain the use of the Tables.

EXAMPLE I.

July 20th, 1889, at about 11h. 15m. A.M., in lat. D.R. 28° S., long. D.R. $177^\circ 30'$ W., the observed altitude of the sun's lower limb was $39^\circ 53' 30''$, when a chronometer, which was fast on G.M.T. 0h. 27m. 44s., showed 11h. 40m. 47s.; height of the eye 16 feet. Find the latitude and the direction of the "Sumner Line."

Time by Chron.	h. m. s.	Sun's obs. alt.....	$39^\circ 53' 30''$
Error fast	11 40 47	Correction—Table I.....	+ 10 48
G.M.T.	11 13 3	Sun's true alt.	<u>40 4 18</u>
Equation of time.....	- 6 3	* C . { $2^{\circ}00$	1 1 38
G. A. T.	11 7 0	{ 10	3 5
Long. D. R.	11 50 0	{ 06	1 51
Westerly hour angle	23 17 0	Mer. alt. at place of obs.....	<u>41 10 52</u>
Easterly hour angle	0 43 0	Mer. zen. dist.	48 49 8
		Declination.....	<u>20 41 47 N.</u>
		Latitude	<u>28 7 21 S.</u>

The azimuth can be obtained from tables, diagrams, or by calculation, thus:—

In spherical triangle of position

$$\text{Sin. Az. : Sin. hour angle :: Sin. pol. dist. : Sin. zen. dist.}$$

$$\text{Or Sin. Az. = Sin. } h. \text{ Cos. dec. Sec. alt.}$$

Sin. h . (0h. 43m. 0s.)	9.270735
Cos. dec. ($20^\circ 42'$)	9.971018
Sec. alt. ($40^\circ 4'$).....	10.116171

$$\text{N. } 13^\circ 11' \text{ E. Sin. } \underline{9.357924}$$

On chart through point { long. D.R. $177^\circ 30'$ W. } draw "Sumner Line"
 { lat. obs. $28^\circ 7' 3$ S. } W. 13° N.

* Entering Table III., with lat. D.R. 28° S., and dec. $20^\circ 40'$ N., contrary names gives $C 2^{\circ}16$.

Table IV., with hour angle 43m. 0s., and $C 2^{\circ}16$, we have the above corrections.

EXAMPLE II.

July 16th, 1888, at about 8h. P.M., in lat. D.R. 8° 30' N., long. D.R. 72° 30' E., when a chronometer which was fast on G.M.T. 3m. 40s. showed 3h. 35m. 0s., the observed altitude of Jupiter near the meridian was 62° 24' 0"; height of the eye 16 feet. Find the latitude and direction of "Summer Line."

Time by Chron.	h. m. s.	3 35 0	Jupiter's obs. alt.	62 24 0
Error fast		3 40	Correction—Table I.	- 4 27
G. M. T.		3 31 20	Jupiter's true alt.	62 19 33
Long. D.R.		4 50 0	*C { 4'' 00.....	35 16
Ship mean time		8 21 20	{ '06.....	32
Sid. time at G. M. noon		7 39 1	Mer. alt. at place of obs.....	62 55 21
Acceleration for 3h. 31m.		{ 30	Mer. zen. dist.	27 4 39
		{ 5	Declination.....	18 36 24 S.
Sidereal time of obs.		16 0 56	Latitude.....	8 28 15 N.
R. A. of Jupiter		15 37 53		
Westerly hour angle		23 3		

Sin. Az. = Sin. h. Cos. dec. Sec. alt.

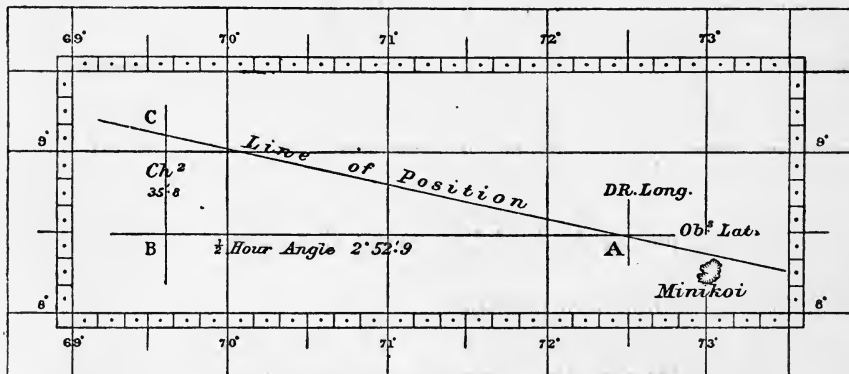
Sin. h. (0h. 23m. 3s.)	9.001756
Cos. dec. (18° 36')	9.9.6702
Sec. alt. (62° 20')	10.333176

S. 11° 49' W. Sin. 9.311634

On chart through point { long. D.R. 72° 30' E. } draw "Summer Line" W. 12° N.
 { lat. obs. 8° 28' 2 N. }

* Entering Table III., with lat. D.R. 8° 30' N., and dec. 18° 36' S., contrary names gives C. 4'' 06.
 From Table IV., with hour angle 23m. 0s., and C. 4'' 06, we have the above corrections.

† The line of position may at once be projected on the chart without calculating the azimuth as follows:—



From the point A on the chart lay off a space A B, taken from the scale of longitude, equal to 1/2 h (in arc) to the right if hour angle is easterly, and to the left if westerly.

On the meridian through this point B lay off B C, the value of Ch², taken from the scale of latitude, in a direction away from the heavenly body.

Join A C, which is the line of position required. This method of projecting the line of position is correct as long as the hour angle limit shown in Table II. is not exceeded.

† For this idea we are indebted to Mr. Niven.

EXAMPLE III.

July 2nd, 1889, at about 6h. 10m. P.M., in lat. D.R. 30° 40' S., long. D.R. 162° 45' E., the observed altitude of α¹ Crucis near the meridian was 57° 41' 30", when a chronometer, which was fast on G.M.T. 0h. 27m. 0s.,

showed 7h. 51m. 30s.; height of the eye 16 feet. Find the latitude and direction of "Sumner Line."

Time by Chron.	<u>h.</u>	<u>m.</u>	<u>s.</u>	Obs. alt. of Star.....	57	41	30
Error fast.....	7	51	30	Correction—Table I.....	-	4	35
G. M. T.	<u>19</u>	<u>24</u>	<u>30</u>	True alt. of Star.....	57	36	55
Long. D.R.	10	51	0	* C { 1.00	22	49	
Ship mean time	6	15	30	{ .40	9	8	
Sid. time at G. M. noon.....	6	35	55	{ .07	1	36	
Acceleration for 19h. 24m.....		3	7	Mer. alt. at place of obs.	58	10	28
			4	Mer. zen. dist.	31	49	32
Sid. time of obs.	12	57	36	Declination	62	29	21 S.
R. A. of Star	12	20	27	Latitude	30	39	49 S.
Westerly hour angle	37	9					

Sin. Az. = Sin. h. Cos. dec. Sec. alt.	
Sin. h. (0h. 37m. 9s.)	9.207873
Cos. dec. (62° 29')	9.664648
Sec. alt. (57° 37')	10.271175
S. 8° W	Sin. 9.143696

On chart through point { long. D.R. 162° 45' E. } draw "Sumner Line"
 { lat. obs. 30° 39' 8 S. } E. 8° S.

* Entering Table III., with lat. D.R. 30° 40' S., dec. 62° 30' S., same name gives C 1''-47
 From Table IV., with hour angle 37m. 9s., and C 1''-47, we have the above corrections.

EXAMPLE IV.

July 6th, 1889, at about 5h. A.M., in latitude D.R. 33° 15' S., longitude D.R. 172° E., when a chronometer, which was fast on G.M.T. 0h. 27m. 11s., showed 6h. 6m. 18sec., the observed altitude of α^1 Crucis near the meridian *below* the pole was 6° 2' 0"; height of the eye 16 feet. Find the latitude and direction of "Sumner Line."

Time by Chron.	<u>h.</u>	<u>m.</u>	<u>s.</u>	Star's obs. alt.	6	2	0
Error fast.....	6	6	18	Dip	3	56	
G. M. T.	<u>5</u>	<u>39</u>	<u>7</u>	Refraction	8	35	
Long. D.R.	11	28	0	Star's true alt.	5	49	29
Ship mean time	17	7	7	Star's declination	62	29	21 S.
Sid. time at G. M. noon	6	54	41	* C { 1''-70	3	40	
Acceleration for 5h. 39m.		49		{ .06	18		
		6					
Sid. time of obs.	0	2	43		62	33	19
R. A. α^1 Crucis	12	20	26		27	26	41
Westerly hour angle from Superior Meridian	11	42	17	Star's true alt.	5	49	29
Westerly hour angle from Inferior Meridian	17	43		Latitude	33	16	10S.

* Entering Table III., with lat. D.R. 33° 15' S., dec. 62° 29' S., contrary names (see explanation of Table III.) gives C. 0''-76.
 From Table IV., with hour angle 17h. 43s., and C. 0''-76, we have the above corrections.

Sin. Az. = Sin. h . Cos. dec. Sec. alt.	
Sin. h . (Oh. 17m 43s.).....	8.887767
Cos. dec. (62° 29')	9.664648
Sec. alt. (5° 49')	10.002242
S. 2° 3' W.....	Sin. 8.554657

On chart through point $\left\{ \begin{array}{l} \text{long. D.R. } 172^\circ \text{ E.} \\ \text{lat. obs. } 33^\circ 16' \cdot 2 \text{ S.} \end{array} \right\}$ draw "Summer Line" E. 2° S.

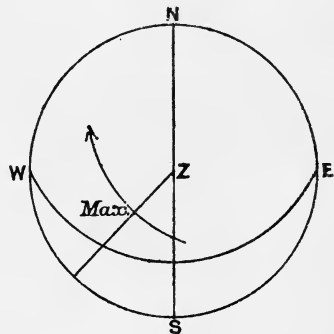
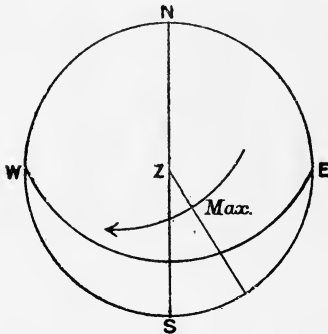
MAXIMUM AND MINIMUM ALTITUDES.

If the observer be changing his latitude, or the heavenly body its declination, the meridian altitude at the superior transit takes place *after* the maximum altitude, if the combined effect of the two movements be towards separation, and *before* if towards approachment.

This can be shown in a simple manner by supposing the two motions united and wholly performed by one—say the heavenly body—as in the accompanying figures on the plane of the celestial horizon.

Separation.

Approachment.



Let K be the united action of the observer and a heavenly body, in the plane of the meridian, towards separation or approachment in knots or ' per hour or " per minute.

C the change in altitude per minute, in the plane of the meridian due to the earth's rotation. Table III.

t expressed in minutes of time, the easterly or westerly hour angle of the heavenly body, at the instant of maximum altitude.

R the correction to be applied to the maximum altitude to reduce it to the meridian.

Then $K t$ will be the change in altitude produced by the movements in latitude and declination.

$C t^2$ will be the change of altitude due to the earth's rotation.

We shall have

$$\begin{aligned}
 R &= K t \smile C t^2 & \text{or} & & R &= K t + C t^2 \\
 C R &= C K t \smile C^2 t^2 & & & C R &= C K t + C^2 t^2 \\
 C R &= \frac{K^2}{4} \smile \left\{ C t - \frac{K}{2} \right\}^2 & & & C R &= \left\{ C t + \frac{K}{2} \right\}^2 - \frac{K^2}{4}
 \end{aligned}$$

It is evident that R or its multiple $C R$ will have its maximum or minimum value when the quantities within the brackets vanish, that is when

$$C t - \frac{K}{2} = 0 \quad \text{or} \quad t = \pm \frac{K}{2C}$$

and then $R = \pm \frac{K^2}{4C} = \pm C t^2$

t will be an easterly hour angle when the observer and the heavenly body are separating, and a westerly one when they are approaching. It will be a portion of apparent solar, lunar, planetary or sidereal time, according to the celestial body observed, and should be converted into its mean time equivalent, when mean time is required.

RULE A.—If the ship be changing her longitude, an easterly t must be increased by a westward, and decreased by an eastward change in longitude, to obtain the correct hour angle.

RULE B.—The converse for a westerly t .

Again, the meridian altitude at the *inferior* transit takes place *before* the minimum altitude, if the tendency of the two movements be towards separation, and *after*, if towards approachment. Consequently, for the inferior meridian **RULES A and B** must be reversed.

EXAMPLE.

February 1st, 1894, in lat. D.R. $47^\circ 45' N.$, long. D.R. $12^\circ 10' W.$ the maximum altitude of the sun's lower limb was $24^\circ 48' 40''$, index error $+ 2' 10''$; height of the eye 15 feet; the ship steaming S. $22\frac{1}{2}^\circ E.$ (true) 25 knots. Find the latitude at ship apparent noon.

<i>Green. Date.</i>	<i>Declination.</i>	<i>Change.</i>
h. m. s.	° ' "	"
S. A. T. 0 0 0	S. 17 0 57	42.94
Long. D.R. 48 40 W.	Cor. 35	
0 48 40	17 0 22	

From *Traverse Table.*

S. $22\frac{1}{2}^\circ E.$ 25' d. lat. $23' 1$ dep. $9' 57 \equiv$ d. long. $14' 3 = 57.2$ sec.
 Observer's change in latitude $23' 1$ South per hour, or $23'' 1$ South per minute.
 Sun's " " declination $42'' 94$ North " " " $0'' 7$ North " "
 Observer and Sun approaching each other at $K 23'' 8$ " "

$$\begin{aligned}
 t &= K. & R. &= Ct.^2 \\
 & \quad 2C. & & \\
 & \quad 23^{\circ}8 & & \\
 & = \frac{23^{\circ}8}{2 \times 1''39} & & = 1''39 \text{ (8m. 34s.)}^2 \\
 & = 8\text{m. 34s.} & & = 1''41'' \text{ Table IV.}
 \end{aligned}$$

As the observer and the sun are approaching each other, t , is a westerly hour angle.

Since the ship is changing her longitude to the eastward at the rate of 57.2 sec. per hour, or 8 sec. during an approximate interval of 8m. 34s. the corrected hour angle is 8m. 42s.

RULE B'

Therefore the maximum altitude took place 8m. 42s. after the meridian transit.

Obs. max. alt.	24	48	40
Index-error	+	2	10
Correction.—Table I.	+	10	27
R. <i>always added for supr. mer.</i>	+	1	41
	25	2	58
	64	57	2
Declination	17	0	22 S.
Latitude at instant of max. alt.	47	56	40 N
Lat. run in 8m. 42s.		3	20
Latitude at S.A. noon.....	48	0	0 N.

LONGITUDE AND LATITUDE FROM EX-MERIDIAN ALTITUDES.

The following method of finding the longitude as well as the latitude from ex-meridian altitudes, founded on Art. 172, Vol. I. of *Spherical and Practical Astronomy*, by Chauvenet, is inserted in the hope that it may be of use to the navigator when from various causes he has been unable to obtain a reliable longitude by other means.

Suppose two altitudes of the sun to have been taken on opposite sides of the meridian, within the limits of Table II., from a ship in motion, and the times noted by a chronometer.

Let z_1 z_2 be the zenith distances derived from the two altitudes.

h_1 h_2 the easterly and westerly hour-angles from the *instants of maximum altitude for each observation.*

C the value obtained from Table III. for the latitude and declination *at noon.*

I the chronometer or mean time interval between the observations.

g the change in longitude during this interval.

Then if z represent the zenith distance of the maximum altitude we have

$$z = z_1 - C h_1^2$$

$$z = z_2 - C h_2^2$$

By subtraction—

$$z_1 - z_2 = C (h_1^2 - h_2^2)$$

$$\text{or } h_1 - h_2 = \frac{z_1 - z_2}{C (h_1 + h_2)} \dots\dots\dots(1).$$

Now the ship being in motion

$$h_1 + h_2 = \text{app. sol. int. } \left\{ \begin{array}{l} + \text{ easterly} \\ - \text{ westerly} \end{array} \right\} g.$$

Very approximately

$$h_1 + h_2 = I \left\{ \begin{array}{l} + \text{ easterly} \\ - \text{ westerly} \end{array} \right\} g \dots\dots\dots(2).$$

From addition of (1) and (2)

$$h_1 = \frac{I \pm g}{2} + \frac{z_1 - z_2}{2C(I \pm g)}$$

and if a_1 and a_2 represent the two altitudes

$$h_1 = \frac{I \pm g}{2} + \frac{*a_2 - a_1}{2C(I \pm g)} \dots\dots\dots(3).$$

* plus, when the second altitude is the greater.

This can be simplified by taking the condition of equal altitudes, for then (3) becomes

$$h_1 = \frac{I \pm g}{2} \dots\dots\dots(4).$$

As far as the altitudes are concerned (3) determines the “degree of dependance” the navigator can place on the resulting longitude, which will be shown by $\frac{15e}{2C(I \pm g)}$, when e is an assumed error committed on the difference of the altitudes.

The preceding is equally applicable to the stars, but it must be remembered that $h_1 + h_2$ will then be a portion of sidereal time, or

$$h_1 + h_2 = I \text{ (in sid. time) } \pm g.$$

It may not be out of place to call the attention of the navigator to the following precautions :—

- I. The altitudes should be taken, when practicable, under identical conditions, *i.e.*, from the same part of the ship, by the same observer, with the same instrument, shades and telescope.
- II. Preference should be given to equal or nearly equal altitudes, with as large an interval between the observations as is possible, keeping in view the limits of Table II.

To show the detail of calculation, the following examples of “equal” and “unequal altitudes” have been computed to place the observer at time of meridian transit in lat. 48° 0' N., long. 12° 0' W., at different times of the year, and the ship proceeding at high and moderate speeds.

Ex. I.—October 17th, 1894, in lat. D.R. 47° 50' N., long. D.R. 11° 50' W., the following sights were taken near the meridian to find the longitude and latitude at apparent noon.

<i>Chron. times.</i>			<i>Obs. alt. sun's l. l.</i>		
<i>h.</i>	<i>m.</i>	<i>secs.</i>			
3	5	35	31	44	0
3	10	59	31	54	20
4	25	22	31	54	20
4	31	11	31	43	10

Index error + 1' 10"; height of the eye 28 feet. The chronometer being fast 3h. 17m. 36s. on G.M.T., and the ship steaming N. 67½° W. (true) at the rate of 19 knots.

From *Traverse Table*.—N. 67½° W. 19' d.lat. 7'·3 dep. 17'·6 ≡ d.long. 26'·2 = 104·8 seconds.

Observer's change in lat. 7'·3 N. per hour or 7''·3 per minute.
 Sun's " " dec. 54''·84 S. " " " 0''·9 " "
 Towards *separation*.....K 8''·2 " "

$$t = \frac{K}{2C}$$

$$= \frac{8''·2}{2 \times 1''·54}$$

$$= 2m. 39·4s.$$

$$R = Ct^2$$

$$= 1''·54 (2m. 39s.)^2$$

$$= 11''.....Table IV$$

The ship's run in longitude in 2m. 39s. is about 4·6 sec. westerly. Therefore the corrected hour angle is 2m. 44s. (*See Rule A. under Max. and Min. Alts.*)

<i>EQUAL ALTITUDES.</i>			<i>THE 2ND AND 3RD OBSERVATIONS.</i>		
<i>Green. date.</i>			<i>Sun's decln.</i>		<i>Equation of time.</i>
Oct. ...	17d. 0h. 0m.		S. 9° 21' 14''·1		14m. 36·84s.
Long. D.R.	47		Cor. 44	Cor.	·4
Oct. ...	17 0 47		9 21 58		14 37·2 - to app. time.

<i>Chron. times.</i>		
	3h. 10m. 59s.	
	4 25 22	
<i>I</i>	1 14 23	
<i>g</i> (in 1h. 14m. 23s.) —	2 11 W.	
<i>I - g</i>	1 12 12	
$h_1 = \frac{1}{2} (I - g)$	0 36 6	

<i>Green. date of 1st obsn.</i>		
	3h. 10m. 59s.	
Error	3 17 36 fast.	
	23 53 23	

S. A. T. of merid. alt.....	0h. 0m. 0s. (a)	
<i>t</i> (separation)	2 44	
S. A. T. of max. alt.....	23 57 16	
h_1 (always subtractive) —	36 6	
S. A. T. of 1st observation ...	23 21 10 (b)	
Equation of time	— 14 37	
S. M. T. of 1st observation ...	23 6 33	
G. M. T. " "	23 53 23	
Longitude at " "	46 50 W.	
Run between (b) and (a) ...	1 10 W.	
Longitude at noon	48 0 W.	
or	12° 0' W.	

Observed altitude ...	31° 54' 20''	
Index-error	+ 1 10	
Correction—Table I. +	9 28	
Ch_1^2 or 1''·54 (36m. 6s.) ²	21 43	
	10 51	
Table IV. }	52	
<i>R</i> (always additive) ...	11	
	32 38 35	
	57 21 25	
Declination	9 21 58 S.	
Latitude at max. alt. ...	47 59 27 N.	
Run in 2m. 44s.	20 N.	
Latitude at noon.....	47 59 47 N.	

UNEQUAL ALTITUDES.

THE 1ST AND 3RD OBSERVATIONS.

Chron. times.			Green. date of 1st obsn.			Altitudes.		
	3h.	5m.	35s.	3h.	5m.	35s.	a_1	31° 44' 0''
	4	25	22	Error	3	17	56	fast a_2 31 54 20
g (in 1h. 19m. 47s.)	I	1	19	47	23	47	59	$a_2 - a_1$ 10 20 = 620"
		—	2	19	W.			
	$I-g$	1	17	28				
	$\frac{1}{2}(I-g)$	0	38	44				

$h_1 = \frac{I-g}{2} + \frac{a_2 - a_1}{2 C(I-g)}$	
$= 38m. 44s. + \frac{620''}{2 \times 1''\cdot54 \times 77m\cdot5}$	
$= 41m. 20s.$	

S. A. T. of mer. alt.	0h. 0m. 0s. (a)	Observed altitude ...	31° 44' 0'
t (separation).....	— 2 44	Index-error	+ 1 10
		Correction—Table I. ...	+ 9 28
S. A. T. of max. alt.	23 57 16	Ch_1^2 or 1'54s. (41m. 20s.) ²	28 28
h_1 (always subtractive)	41 20	Table IV. ...	14 14
		R (always additive)...	1 8
S. A. T. of 1st observation	23 15 56 (b)		
Equation of time	14 37		
			32 38 39
S. M. T. of 1st observation...	23 1 19		
G. M. T. " "	23 47 59		
		Declination	9 21 58 S.
Longitude at ,, " "	46 40 W.	Latitude at max. alt.	47 59 23 N
Run between (b) and (a)	1 19 W.	Run in 2m. 44s.	20 N.
Longitude at noon	47 59 W.	Latitude at noon	47 59 43 N
or	11° 59'7W.		

“Degree of Dependance.” Supposing an error of 30" to have been committed on the *difference* of the altitudes. The error in the longitude will be

For the equal altitudes $\frac{15 \times 30''}{2 \times 1''\cdot54 \times 72m\cdot2} = 2'$

For the unequal altitudes $\frac{15 \times 30''}{2 \times 1\cdot54 \times 77m\cdot5} = 1\cdot9$.

Ex. II.—December 11th, 1894, in lat. D.R. 48° 10' N., long. D.R. 12° 15' W., the following observations were taken near the meridian, to find the longitude and latitude at apparent noon.

Chron. times.			Obs. Alts. sun's l. l.
h.	m.	s.	
7	23	11	17 45 10
7	38	44	17 57 0
9	17	8	17 58 0
9	23	8	17 45 10

Index error + 2' 10"; height of the eye 31 feet. The chronometer being slow 4h. 18m. 23s. on G.M.T., and the ship steaming S. 22° W. (true) at 14 knots.

S. A. T. of mer. alt.	h. 0	m. 0	s. 0	(a)	Observed altitude	17	45	10
<i>t</i> (approachment)		4	57.5		Index-error		2	10
S. A. T. of max. alt.	0	4	57.5		Correction—Table I.		7	58
h_1 (always subtractive)		54	26.7		$C h_1^2$ or $1'' \cdot 28$ (54m. 30s) ² } Table IV.		49	30
S. A. T. of 1st observation	23	10	30.8	(b)	R		3	58
Equation of time		6	29					32
S. M. T. of 1st observation	23	4	1.8			18	59	12
G. M. T. „ „ „	23	51	34		Declination	71	0	48
Longitude at „ „		47	32	W.		23	2	26 S.
Run between (b) and (a) ...				26 W.	Latitude at max. alt.	47	58	22 N.
Longitude at noon		47	58	W.	Run in 5 min.		1	5
or.....				11° 59' 5 W.	Latitude at noon	47	59	27 N.

“Degree of Dependence.”—Assuming an error of 30" to have been committed on the *difference* of the altitudes. The error in the longitude will be

For the equal altitudes $\frac{15 \times 30''}{2 \times 1'' \cdot 28 \times 109m.} = 1' \cdot 6.$

For the unequal altitudes $\frac{15 \times 30''}{2 \times 1'' \cdot 28 \times 103m.} = 1' \cdot 7$

EXAMPLE III.—July 12th, 1894, at dawn, in lat. D.R. 47° 50' N., long. D.R. 11° 45' W., the following sights were taken near the meridian to determine the longitude and latitude at time of transit:—

<i>Chron. times.</i>			<i>Obs. alts. Markab.</i>		
h.	m.	s.	°	'	''
6	57	7	56	5	0
7	57	45	56	5	0
8	0	0	55	59	30

Index-error + 1' 30", height of the eye 18 feet. The chronometer being fast on G.M.T. 3^h. 2^m. 46^s., and the ship steaming N. 45° E. (true) at 18 knots.

TO FIND S.M.T. OF MERIDIAN TRANSIT.

<i>Green. date approx.</i>	<i>R. A. M. Sun.</i>	<i>R. A. and declin. Markab.</i>
d. h. m.	h. m. s.	h. m. s.
S. A. T. approx. July...11 15 31 (Table V.)	7 17 31.7	22 59 30.9
Equation of time ... 5	2 37.7	
	3.8	N. 14° 38' 11.3"
S. M. T. approx11 15 36	7 20 13.2	
Long. D.R. 47 W.		
G. M. T. approx.....11 16 23		
	h. m. s.	
R.A. Markab...	22 59 30.9	
R.A. M.Sun ...	7 20 13.2	
S.M.T. of transit ...	15 39 17.7	

From *Traverse Table*.

N. 45° E. 18' d.lat. 12'·83 dep. 12'·73 \equiv d.long. 19'·0 = 76 seconds.

$$t = \frac{K}{2C} = \frac{12''·73}{2 \times 2''·3} = 2\text{m. } 46\text{s.}$$

$$R = Ct^2 = 2''·3 (2\text{m. } 46\text{s.})^2 (\text{Table IV.}) = 19''$$

The ship's run in longitude in 2m. 46s. is about 3·5s.

Therefore the corrected hour angle is 2m. 42·5s. (*See Rule A. under Max. and Min. Alts.*)

EQUAL ALTITUDES.

Chron. times.

h.	m.	s.
6	57	7
7	57	45

$$I \quad 1 \quad 0 \quad 38$$

$$g \text{ in } 1\text{h. } 0\text{m. } 38\text{s.} \quad \underline{\quad 1 \quad 17 \quad \text{E.}} \quad \underline{\quad}$$

$$I + g \quad 1 \quad 1 \quad 55$$

$$h_1 = \frac{1}{2} (I + g) \quad \underline{\underline{0 \quad 30 \quad 57\cdot5}}$$

S. M. T. of transit	h.	m.	s.
<i>t</i> (separation)	15	39	17·7 (a)
	2	42·5	
S. M. T. of max. alt.	15	36	35·2
h_1	30	57·5	
S. M. T. of 1st obsn.	15	5	37·7 (b)
G. M. T. " "	15	54	21
Longitude at " "	48	43·3	W.
Run between (b) and (a)	42·7	E.	
Longitude at transit	48	0·6	W.
or	12°	0'·1	W.

1ST AND 2ND OBSERVATIONS.

Green. date.

h.	m.	s.
6	57	7

Error 3 2 46 fast.

$$\underline{\underline{15 \quad 54 \quad 21}}$$

Observed altitude.....	56	5	0
Index-error	1	30	
	56	6	30
Dip and refr.	4	50	
	56	1	40
Ch_1^2 or $2''·3 \times (30\text{m. } 57\text{s.})^2$ {	32	2	
Table IV. ... {	4	48	
<i>R</i>	19		
	56	38	49
	33	21	11
Declination	14	38	11 N.
Latitude at max. alt.	47	59	22 N.
Run in 2m. 42s.	35	N.	
Latitude at transit	47	59	57 N.

UNEQUAL ALTITUDES.

Chron. times.

h.	m.	s.
6	57	7
8	0	0

$$I \text{ in mean time$$

$$\text{Acceleration for } 1\text{h. } 3\text{m.} \dots \dots \dots 10$$

$$g \text{ " " "$$

$$\underline{\quad 1 \quad 20 \quad \text{E.}}$$

$$\underline{\quad 1 \quad 4 \quad 23}$$

$$\frac{1}{2}(I+g) \dots \dots \dots \underline{\underline{0 \quad 32 \quad 11\cdot5}}$$

THE 1ST AND 3RD OBSERVATIONS.

Altitudes.

$$a_1 \quad 56 \quad 5 \quad 0$$

$$a_2 \quad 55 \quad 59 \quad 30$$

$$a_2 - a_1 \quad \underline{\quad - \quad 5 \quad 30 \quad} = - 330''$$

$$h_1 = \frac{I + g}{2} + \frac{a_2 - a_1}{2C(I + g)} = 32\text{m. } 11\cdot5\text{s.} - \frac{330''}{2 \times 2''·3 \times 64\cdot4\text{m.}}$$

$$= 32\text{m. } 11\cdot5\text{s.} - 1\text{m. } 7\text{s.}$$

$$= 31\text{m. } 4\cdot5\text{s. in sidereal time.}$$

$$= 30\text{m. } 59\cdot5\text{s. in mean time.}$$

S. M. T. of transit	<u>h.</u>	<u>m.</u>	<u>s.</u>	Observed altitude	56	5	0
<i>t</i> (separation)	15	39	17.7 (<i>a</i>)	Index error		1	30
		<u>2</u>	<u>42.5</u>				
S. M. T. of max. alt.	15	36	35.2	Refraction and dip	56	6	30
<i>h</i> ₁		<u>30</u>	<u>59.5</u>			<u>4</u>	<u>50</u>
S. M. T. of 1st obs.	15	5	35.7 (<i>b</i>)		56	1	40
G. M. T. ,, ,,	15	54	?}	<i>C h</i> ₁ ² or 2''3 × (31m.) ² {		32	2
				Table IV. {		4	48
Longitude at ,, ,,	48	45.3	W.	<i>R</i>			19
Run between (<i>b</i>) and (<i>a</i>)...			42.7 E.		56	38	49
Longitude at transit	48	2.6	W.				
or.....	12°	0.6	W.	Declination	33	21	11
					14	38	11 N.
				Latitude at max. alt.	47	59	22 N.
				Run in 2m. 42s.			35 N.
				Latitude at transit	47	59	57 N.

“Degree of Dependence.”—Assuming an error of 30" to have been committed on the *difference* of the altitudes. The error in the longitude will be—

$$\text{For the equal altitudes } \frac{15 \times 30''}{2 \times 2''3 \times 62m.} = 1''58.$$

$$\text{For the unequal altitudes } \frac{15 \times 30''}{2 \times 2''3 \times 65m.} = 1''5.$$

The following observations, selected from several procured for the authors by W. H. Bolt, Esq., were taken on the S.S. “Ophir,” Captain Ruthven, when in the Mediterranean:—

Date.	G. M. T. Chron.	Obs. alt.	Sun's l.l.	True Course.	Position at Noon.
28 Sept., 1894.					
h. m.	h. m. s.	° ' "			
11 30 A.M.	22 50 1	48 35 55	N 74 E.	13.5	
11 41 ,,	23 0 38	48 57 30	,,		Lat. 38° 34' N.
0 23 P.M.	23 45 3	48 45 15	,,		Long. 7 31 E.
0 38 ,,	23 58 59	48 8 40	,,		

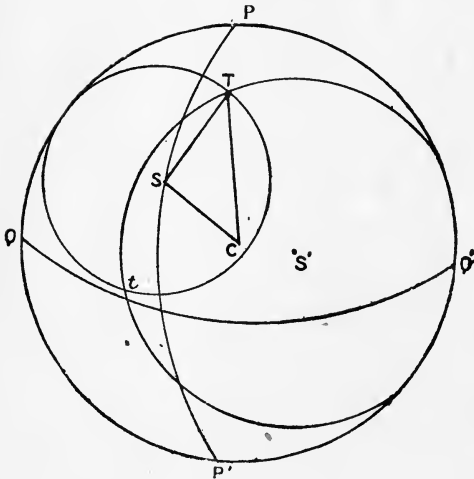
Height of the eye 36 feet.

The results obtained are:—

1st and 4th obs.	Longitude	7 30.2 E.	Latitude	38 32.2 N.
1st ,, 3rd ,,	,,	7 30.9	,,	38 32.4
2nd ,, 4th ,,	,,	7 31.5	,,	38 32.5
2nd ,, 3rd ,,	,,	7 32.2	,,	38 32.0
Mean	..	7 31.2	,,	38 32.3

THE SUMNER PROBLEM.

GENERAL PRINCIPLES.



Let P, P' be the poles of the terrestrial sphere, C its centre, QQ' the equator; and let the straight line joining the centres of the heavenly body and the earth (considered spherical) cut the surface of the latter at the point S .

This point, termed the geographical position of the heavenly body, is readily determined in position by taking the heavenly body's declination as its latitude, and the Greenwich hour

angle (expressed in arc) as its longitude.

Let $SC T$ represent the observed zenith distance of the heavenly body, T being the point where CT meets the surface of the earth.

Now, if with S as pole, and with spherical radius arc ST , which measures the observed zenith distance, a small circle Tt be described, at all places situate on this circle the altitude of the heavenly body must be the same.

Such a circle is called a "Parallel of Equal Altitude," and it is clear that the ship must be somewhere on its circumference.

If two parallels of equal altitude be obtained from observations of the same, or of two different heavenly bodies, since the ship must lie on both of them, she must be on one of the two points of their intersection, the latitude by account limiting the position of the ship to one only of these points.

For a successful application of the above principle, certain limitations of bearing are necessary, as is explained in the usual text books on Navigation.

Parallels of equal altitude on the sphere, when projected on a Mercator's chart, become what are termed "Curves of equal altitude," being closed or open curves, according to the position on the surface of the sphere of the pole relatively to the circumference of the parallel of equal altitude.

A tangent to a curve of equal altitude at the point representing the true position of the ship, or at a point on the curve very near to this, may be considered for a short distance to coalesce with the portion of the curve in the neighbourhood of that point, and is called a "Line of Position."

When the heavenly body is on or near the prime vertical, a greater length of the curve of equal altitude in the neighbourhood of the point representing the ship's position, may, without any great error, be replaced by a straight line on the Mercator's chart, than is the case when the body is near the meridian.

It is evident, therefore, that the point on the chart through which a line of position is drawn should be as near as possible to the point which would represent the true place of the ship.

Since the bearing of a heavenly body is always at right angles to the tangent to the parallel of equal altitude, at any point, and from the nature of the construction of Mercator's chart all angles upon the sphere remain the same in magnitude when projected on the chart, it is easy to draw a line of position on a Mercator's chart.

The use of what are commonly known as "Sumner Lines," or "Lines of Position," has of late years attracted the attention of navigators to a much greater degree than formerly, and a growing interest seems to be awakened as to the advantages to be derived from the practice of drawing on the chart a single "line of position," or from the determination of the ship's position by the intersection of two such lines.

For example—Simultaneous altitudes of two stars (differing sufficiently in bearing) taken during twilight or moonlight, will give a good position of the ship without the element of error arising from "run," and in the case of a line of position obtained from a single observation, it should be borne in mind that such a line can frequently be made use of for making the land (should it run towards it), or as a clearing mark for it should it run parallel to the trend of the coast. It is also occasionally useful, in conjunction with a sounding, in giving an approximate position, if at the time of observation a cast of the lead be taken.

LINE OF POSITION FROM ONE OBSERVATION ONLY.

In endeavouring to arrive at some conclusion as to the best method of obtaining a reliable line of position from one observation only, it must be fully recognized that the unwitting possession of a good latitude or longitude, drifting due to current, error of course, &c., &c., may combine in favour of one method more than another.

With an *estimated* latitude, a longitude may be computed from an observation of a heavenly body (not near the meridian). The position of

the ship thus determined being marked on the chart, and a straight line drawn through it at right angles to the true bearing of the heavenly body at the time of observation, a line of position is obtained. This mode of proceeding is the one most generally practised, and is known as the "Chronometer method."

It is evident that the point on the chart thus determined is the projection of the point on the surface of the terrestrial sphere, in which the parallel of equal altitude corresponding to the observation is cut by a parallel of *estimated* latitude.

To use the chronometer method with advantage necessitates a favourable condition, viz., that the heavenly body observed should be on or near the prime vertical, the method practically *failing* to give a good line of position when the body is near the meridian, particularly so should the *estimated latitude be very much in error*.

It may here be remembered that a heavenly body can be on the prime vertical only when the latitude and declination are of the same name, and the latitude is greater than the declination.

Thus the most favourable opportunity for calculation by the "Chronometer method" does not, for the sun at any rate, present itself with such frequency as might at first sight appear.

The "New Navigation," first introduced by Commandant Marcq-Saint-Hilaire, affords a means of obtaining a line of position by a method which is not more difficult either in computation or in execution on the chart than is the "Chronometer," and is of special value when, from circumstances of weather, &c., sights have not been obtained for some days, and consequently the ship's position cannot be estimated with any degree of certainty.

In the accompanying figure let S represent the geographical position of a heavenly body, the altitude of which has been observed, $y T t$ the corresponding parallel of equal altitude, E the estimated position of the ship, and P the pole of the terrestrial sphere.

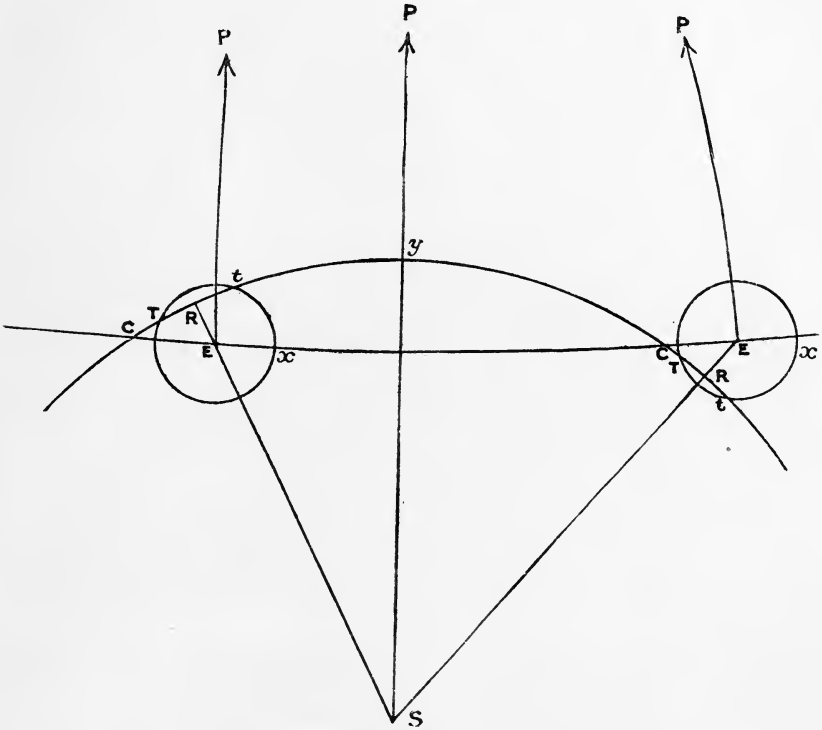
Now the distance between E and the true place of the ship being quite unknown, assume this distance to be *at most* ET . With E as pole, and arc ET as spherical radius, describe a small circle $T t x$.

The ship's position *must be somewhere* on the earth's surface comprised within this small circle, and as she must be on the parallel of equal altitude $T t y$, her true place must be at some point on the arc $T R t$ between T and t .

Now, as it is impossible to say at what point of the arc $T R t$ the ship is situate, the point R , the *middle* point of the arc $T R t$, is the *best*, which can be selected as representing her position, since it is the mean of all the positions which she *may* occupy on that arc.

The point R will always be nearer to the true position of the ship

than will the estimated position E , for ER being at right angles to the arc TRt , it follows that RT is always less than ET or Et .



R is the point in the "New Navigation" through which a line of position is drawn.

The data used in the calculation are the estimated latitude and longitude of the ship.

Now E and S being the poles of $Tt\alpha$, and $Tt\gamma$ respectively, ER and SR cut the latter circle at right angles, and therefore form part of the same great circle, since SR is an arc of a vertical circle.

In the spherical triangle PSE , with polar distance PS , co-latitude PE , and hour angle $SP E$ (two sides and the included angle), compute the zenith distance ES for the estimated position of the ship. This compared with RS , the true zenith distance (obtained by observation), gives ER , the difference between the computed and true altitudes.

This difference, though really an arc of a great circle, is so small that it may, without any great error, be considered as an arc of a loxodrome or rhumb line, and will therefore, in accordance with the principles upon which Mercator's chart is constructed, be projected on the chart as a straight line.

The difference $E R$, projected on the chart, measured (from the graduated meridian at the side of the chart) from E in the direction of the azimuth $E S$, if the observed altitude (corrected) be *greater* than that calculated, and in an *opposite* direction if *less*, will determine the position of R , which, as has been shewn, is the *most probable* position of the ship.

A straight line drawn through R , at right angles to $E R$, will be the "line of position" as determined by the "New Navigation Method."

Properties of the point R. The following important advantages possessed by the point R are worthy of notice.

Should the true place of the ship be at t , and an error be committed in the estimated latitude, which causes the Chronometer method to place the ship on the parallel of latitude passing through T , the distance of the ship's position, thus determined, from her true place t , would be equal to the whole distance $T t$.

Again, the true place of the ship being at t , the Chronometer method, owing to error in the estimated latitude, may place the ship at C beyond T and t , in which case the distance between the point given by the "Chronometer" and the true place of the ship at t , would exceed $T t$.

Whereas it is clear that the "New Navigation" gives a point R , through which a line of position may be drawn, which *can never be at a greater distance from the true place of the ship than one half of the distance $T t$.*

Again, it must be evident that an error in altitude observed produces at *all times its whole effect, and no more*, in displacing a point as R , and therefore the line of position drawn through that point.

The point of intersection of two lines of position, obtained from observations of the same or of two different heavenly bodies, will determine the position of the ship with great accuracy.

THE DOUBLE ALTITUDE PROBLEM.

The Double Altitude Problem is one of the most important in Navigation, and it is hoped that the solution given in these pages may be of use to those engaged in navigation.

The result may be worked out either with or without having recourse to the chart.

Should there be any change in the ship's position between the observations, the 1st observation must be brought up to the place of the 2nd by the "run" in the interval in the usual way.

For the sake of simplicity, "run" has been left out of consideration in the explanation.

Now, $TD = TC$. Sin. $TC D$.

$TD = CR$. Sec. RCT . Sin. $TC D$.

$$\text{or Cor}^n \text{ for Lat.} = \frac{p. \text{Sine } \alpha}{\text{Sin. } (\alpha - \beta)}$$

Again, $CD = CT$. Cos. $TC D$.

$CD = CR$. Sec. RCT . Cos. $TC D$.

$$\text{Cor}^n \text{ for Long. Cos. Lat.} = \frac{p. \text{Cos. } \alpha}{\text{Sin. } (\alpha - \beta)}$$

$$\therefore \text{Cor}^n \text{ for Long.} = \frac{p. \text{Cos. } \alpha}{\text{Cos. Lat. sin. } (\alpha - \beta)}$$

$(\alpha - \beta)$ being the angle between the greater and lesser bearings.

The following might be considered more simple to some navigators:— Mark on the chart, or on tracing paper pinned down to it, the point C determined from the assumed latitude, and the longitude deduced from the altitude of A , and the line of position CT at right angles to true bearing of A . Through C draw the line of bearing of B , and from C measure off the difference (p) between the calculated and corrected observed altitudes, either towards B , or in the opposite direction, according as the computed altitude is less or greater than the corrected observed altitude. Then RT drawn at right angles to RB will give the second line of position.

Now, it is evident from the figure, and from all similar figures that can be drawn, that the length of the arm RT *must always be shorter* than HT —the one obtained from the observed altitude of B by the “Chronometer method.”

Also, since $TC D$ is greater than $TH D$, C must be nearer to T than is H .

Therefore, the line of position derived from the azimuth of B at C is less in error than one obtained from the azimuth at H .

From the remarks, page 21, it follows that the tangent to the curve of Equal Altitude representing the parallel HRT , at the point of projection of R on the chart, will give a more reliable line of position, and a more accurate intersection, than will a tangent to the curve at the point representing H .

It is to be remembered that the observation corresponding to the *greater* bearing should be worked by the “Chronometer” method, and the one corresponding to the *lesser* bearing by the “New Navigation” method.

The ship apparent time will naturally be obtained from the observation corresponding to the greater bearing, and will, therefore, be less liable to error than if obtained from the other.

The following examples taken on board H.M.S. “*Orlando*” illustrate the solution of the problem:—

EXAMPLE I.

July 6th, 1889, in Latitude D.R. 34° 0' S., and Longitude D.R. 173° 0' E., the following observations were taken to determine the position of the ship at the time of the second observation; and also the direction of the line of observation:—

MEAN TIME NEARLY. CHRONOMETER TIME.

H. M. S.	H. M. S.
8 10 A.M.	9 6 18
10 15 "	11 10 50
Run of ship in interval S. 25° E. (true) 20 miles.	

1st OBSERVATION.

Greater bearing, worked by the Chronometer Method.

Chron. Time	h. m. s.	Corrected Dec.	m. s.
Error fast	- 27 11		
G.M.T., July 6th	8 3 7	Eq. of time	4 24
		+ to app. time.	

Lat.	34 0 S.	Sec.	081423
Dec.	22 43 N.	Sec.	035069
Z. dist.	56 43		
	79 21		

Sum	136 4	Hour Angle	20h. 6m. 25s.
Diff.	22 38	Hour Angle	20h. 6m. 25s.
Hour Angle	20h. 6m. 25s.	Hour Angle	20h. 6m. 25s.

Ship App. Time	H. M. S.
Eq. of Time	20 6 25
Ship Mean Time	+ 4 24
G.M.T.	20 10 49
Long. in Time	8 39 7
Longitude	11 31 42
	172° 56 1/2 E

Sun's true bearing from Burdwood's Tables N. 58° E. Therefore line of position runs N. 37° W. and S. 37° E., which, if projected on the chart, will be found to pass about 12 miles to the eastward of North Cape, New Zealand.

Run between observations S. 25° E. 20'

Lat. D.R., 1st obs	34 0 S.	Long. by 1st obs	172 56 1/2 E.
D. Lat.	18 S.	D. Long.	10 E.
Lat. D.R., 2nd obs	52 18 S.	Long. at time of 2nd obs.	173 6 1/2 E.
		brought up by Run	173 6 1/2 E.

TRUE ALTITUDE SUN'S CENTRE.

0 39	M. S.
27 40	27 11 fast
	on G.M.T.

ERROR OF CHRON.

2ND OBSERVATION.

Lesser bearing, worked by the "New Navigation Method," with Lat. D.R. 34° 18' S., and Long. 173° 54' E., brought up from 1st obs. by Run.

Chron. Time	h. m. s.	Corrected Dec.	m. s.
Error	- 27 11		
G.M.T.	10 43 39	Eq. of time	22 43 N.
		+ to app. time.	4 25

Hour Angle	1 48 24
Hour Angle	1h. 48m. 24s.
Lat.	34 18 S.
Dec.	22 43 N.

Hour Angle	1h. 48m. 24s.	Hour Angle	1h. 48m. 24s.
Lat.	34 18 S.	Lat.	34 18 S.
Dec.	22 43 N.	Dec.	22 43 N.
Hour Angle	23° 26'	Hour Angle	23° 26'
Lat. + Dec.	23° 26'	Lat. + Dec.	23° 26'
Zenith Dist.	62° 34'	Zenith Dist.	62° 34'
Computed Alt.	27° 20'	Computed Alt.	27° 20'
Obs. Alt. Corrected	27° 40'	Obs. Alt. Corrected	27° 40'

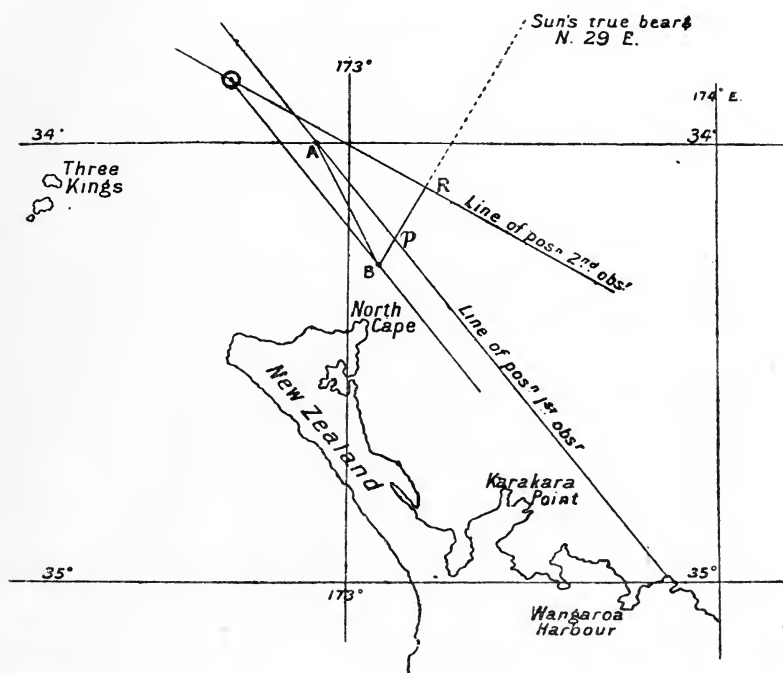
$\theta, p = + 14'$

Sun's true bearing from Burdwood's Tables N. 29° E. Therefore line of position runs N. 61° W. and S. 61° E.

Cor. for Lat.	= Sin. (a - β)	Cor. for Long.	= Cos. Lat. Sin. (α - β)
Log. p	1.1461	Log. p	1.1461
Sin. α	9.9023	Cos. α	9.7735
Cosec. (α - β)	3.997	Sec. Lat.	9830
		Cosec. (α - β)	3807
			25'
			1.3393

Lat. D.R., 2nd obs.	34 18 S.	Long. 2nd obs, brought	173 6 1/2 E.
Cor.	27 1/2 N.	up from 1st.	173 6 1/2 E.
Lat. 2nd obs.	33° 50 1/2 S.	Cor.	25' W.
		Long. 2nd obs	172° 40 1/2 E.

EXAMPLE I. PROJECTED ON A CHART.



- A Position from 1st observation with D.R. Lat. Chronometer Method.
 AB Run between observations.
 BR Difference between true and computed altitudes.
 C Position of ship at 2nd observation

EXAMPLE II.—Observations of two stars taken during moonlight at practically the same time. April 14th, 1889, at about 10.30 p.m., in Lat. D. R. 34° 0' S., and Long. D. R. 153° 30' E., the following observations were taken to determine position of ship.

CHRON. TIME.
12h. 44m. 5s.
13h. 46m. 40s.

TRUE ALTITUDES.
Antares (greater bearing) 35° 0'.
Arcturus (lesser bearing) 28° 52'.

Antares having the greater bearing, worked by the Chronometer Method.

Chron. Time 12 44 5
Error fast - 23 26
G. M. T. 0 20 39

Arcturus having lesser bearing, worked by the Chronometer Method.

Chron. Time 12 46 40
Error fast - 23 26
G. M. T. 0 23 14

Lat. 34° 0' S. Sec. 081495
Dec. 26 11 S. Sec. 047020

Lat. 34° 0' S. Sec. 081495
Dec. 26 11 S. Sec. 047020

Z. Dist. 7 49
Sum 62 19. Hav: 4 71 6949

Z. Dist. 7 49
Sum 62 19. Hav: 4 71 6949

Diff. 47 11. Hav: 4 602294
Hav: 9 447639

Diff. 47 11. Hav: 4 602294
Hav: 9 447639

Star's Hour Angle. h. m. s.
" R. A. 19 44 15
Sidereal Time 16 22 37

Star's Hour Angle. h. m. s.
" R. A. 19 44 15
Sidereal Time 16 22 37

R. A. Mean Sun 36 6 52
Ship M. Time 1 31 27
G. M. T. 10 35 25

R. A. Mean Sun 36 6 52
Ship M. Time 1 31 27
G. M. T. 10 35 25

Long. in Time 10 14 46
Longitude 153° 41 1/2' E.

Long. in Time 10 14 46
Longitude 153° 41 1/2' E.

Star's Azimuth obtained by calculation or taken from Weir's Azimuth Diagram, S. 80° E. ∴ line of position N. 10° E. and S. 10° W.

Star's Azimuth obtained by calculation or taken from Weir's Azimuth Diagram, S. 80° E. ∴ line of position N. 10° E. and S. 10° W.

Cor. for Lat. = $\frac{p \sin. \alpha}{\sin. (\alpha - \beta)}$

Log. 7 8461
Sin. 80° 9 9933
Cos. 67° 0390

Cor. for Long. = $\frac{p \cos. \alpha}{\cos. \text{Lat. Sin. } (\alpha - \beta)}$

Log. 7 1/2 8744
Lat. D. R. 34° 0' S.
Corr. 7 1/2 S.

Log. 7 1/2 8744
Log. from greater bearing 153° 41 1/2' E.
Cor. for Long. 1 1/2' W.

Latitude 34° 7 1/2' S.

Longitude 153° 40' E.

TABLE I



HEIGHT OF THE EYE.

Observed Altitude.	8 FEET.		9 FEET.		10 FEET.		11 FEET.		12 FEET.		13 FEET.		Observed Altitude.
	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	
	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	
6 30	5 21	10 48	5 11	10 58	5 1	11 8	4 52	11 17	4 43	11 26	4 35	11 35	6 30
40	5 32	10 37	5 22	10 47	5 12	10 57	5 3	11 6	4 54	11 15	4 46	11 24	40
50	5 42	10 27	5 32	10 37	5 22	10 47	5 13	10 56	5 4	11 5	4 56	11 14	50
7 0	5 52	10 17	5 42	10 27	5 32	10 37	5 23	10 46	5 14	10 55	5 5	11 4	7 0
10	6 2	10 7	5 52	10 17	5 42	10 27	5 33	10 36	5 24	10 45	5 15	10 54	10
20	6 11	9 58	6 1	10 8	5 51	10 18	5 42	10 27	5 33	10 36	5 24	10 45	20
7 30	6 20	9 49	6 10	9 59	6 0	10 9	5 51	10 18	5 42	10 27	5 33	10 36	7 30
40	6 28	9 40	6 18	9 50	6 8	10 0	5 59	10 9	5 50	10 18	5 42	10 27	40
50	6 36	9 32	6 26	9 42	6 16	9 52	6 7	10 1	5 58	10 10	5 50	10 19	50
8 0	6 44	9 24	6 34	9 34	6 24	9 44	6 15	9 53	6 6	10 2	5 58	10 11	8 0
10	6 52	9 17	6 42	9 27	6 32	9 37	6 23	9 46	6 14	9 55	6 5	10 4	10
20	6 59	9 10	6 49	9 20	6 39	9 30	6 30	9 39	6 21	9 48	6 12	9 57	20
8 30	7 6	9 3	6 56	9 13	6 46	9 23	6 37	9 32	6 28	9 41	6 19	9 50	8 30
40	7 13	8 56	7 3	9 6	6 53	9 16	6 44	9 25	6 35	9 34	6 26	9 43	40
50	7 20	8 49	7 10	8 59	7 0	9 9	6 51	9 18	6 42	9 27	6 33	9 36	50
9 0	7 26	8 43	7 16	8 53	7 6	9 3	6 57	9 12	6 48	9 21	6 39	9 30	9 0
20	7 39	8 30	7 29	8 40	7 19	8 50	7 10	8 59	7 1	9 8	6 52	9 16	20
40	7 50	8 19	7 40	8 29	7 30	8 39	7 21	8 48	7 12	8 57	7 3	9 5	40
10 0	8 0	8 9	7 50	8 19	7 40	8 29	7 31	8 38	7 22	8 47	7 13	8 55	10 0
20	8 10	7 59	8 0	8 9	7 50	8 19	7 41	8 28	7 32	8 37	7 23	8 45	20
40	8 20	7 49	8 10	7 59	8 0	8 9	7 51	8 18	7 42	8 27	7 33	8 35	40
11 0	8 29	7 40	8 19	7 50	8 9	7 59	8 0	8 8	7 51	8 18	7 42	8 26	11 0
30	8 41	7 28	8 31	7 38	8 21	7 47	8 12	7 56	8 3	8 6	7 54	8 14	30
12 0	8 53	7 17	8 43	7 27	8 33	7 36	8 24	7 45	8 15	7 54	8 6	8 2	12 0
12 30	9 3	7 6	8 53	7 16	8 43	7 26	8 34	7 35	8 25	7 44	8 16	7 52	12 30
13 0	9 13	6 56	9 3	7 6	8 53	7 16	8 44	7 25	8 35	7 34	8 26	7 42	13 0
30	9 22	6 47	9 12	6 57	9 2	7 6	8 53	7 15	8 44	7 25	8 35	7 33	30
14 0	9 31	6 39	9 21	6 49	9 11	6 58	9 2	7 7	8 53	7 16	8 44	7 24	14 0
15	9 47	6 23	9 37	6 33	9 27	6 42	9 18	6 51	9 9	7 0	9 0	7 8	15
16	10 1	6 9	9 51	6 19	9 41	6 29	9 32	6 37	9 23	6 46	9 14	6 54	16
17	10 13	5 56	10 3	6 6	9 53	6 16	9 44	6 25	9 35	6 34	9 26	6 42	17
18	10 23	5 45	10 13	5 55	10 3	6 5	9 54	6 14	9 45	6 23	9 36	6 32	18
19	10 33	5 35	10 23	5 45	10 13	5 55	10 4	6 4	9 55	6 13	9 46	6 22	19
20	10 43	5 26	10 33	5 36	10 23	5 46	10 12	5 55	10 4	6 4	9 55	6 13	20
22	10 58	5 10	10 48	5 20	10 38	5 30	10 29	5 39	10 20	5 48	10 11	5 57	22
24	11 11	4 57	11 1	5 7	10 51	5 17	10 42	5 26	10 33	5 35	10 24	5 44	24
26	11 22	4 46	11 12	4 56	11 2	5 6	10 53	5 15	10 44	5 24	10 35	5 33	26
28	11 32	4 36	11 22	4 46	11 12	4 56	11 3	5 5	10 54	5 14	10 45	5 23	28
30	11 40	4 27	11 30	4 37	11 20	4 47	11 11	4 56	11 2	5 5	10 53	5 14	30
32	11 48	4 20	11 38	4 30	11 28	4 40	11 19	4 49	11 10	4 58	11 2	5 6	32
34	11 54	4 13	11 44	4 23	11 34	4 33	11 25	4 42	11 16	4 51	11 9	4 59	34
36	12 0	4 7	11 50	4 17	11 40	4 27	11 31	4 36	11 22	4 45	11 15	4 53	36
38	12 6	4 1	11 56	4 11	11 46	4 21	11 37	4 30	11 28	4 39	11 21	4 47	38
40	12 10	3 56	12 0	4 6	11 50	4 16	11 41	4 25	11 32	4 34	11 25	4 42	40
45	12 21	3 45	12 11	3 55	12 1	4 5	11 52	4 14	11 43	4 23	11 36	4 31	45
50	12 30	3 36	12 20	3 46	12 10	3 56	12 1	4 5	11 52	4 14	11 44	4 22	50
55	12 37	3 28	12 27	3 38	12 17	3 48	12 8	3 57	11 59	4 6	11 51	4 14	55
60	12 44	3 21	12 34	3 31	12 24	3 41	12 15	3 50	12 6	4 5	11 58	4 7	60
65	12 50	3 14	12 40	3 24	12 30	3 34	12 21	3 43	12 12	3 52	12 4	4 0	65
70	12 55	3 8	12 45	3 18	12 35	3 28	12 26	3 37	12 17	3 46	12 9	3 54	70
75	13 0	3 2	12 50	3 12	12 40	3 22	12 31	3 31	12 22	3 40	12 14	3 48	75
80	13 4	2 57	12 54	3 7	12 44	3 17	12 35	3 26	12 26	3 35	12 18	3 43	80
85	13 9	2 52	12 59	3 2	12 49	3 12	12 40	3 21	12 31	3 30	12 23	3 38	85
90	13 13	2 47	13 3	2 57	12 53	3 7	12 44	3 16	12 35	3 25	12 27	3 33	90

Additional Correction for Sun's Altitude only.	Day of Month.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	1st to 15th	+18"	+14"	+8"	0"	-8"	-13"	-14"	-11"	-5"	+3"	+11"	+17"
	16th to 31st	+16	+12	+4	-4	-11	-14	-13	-8	-1	+7	+14	+18

TABLE I.—ALTITUDE CORRECTION.

Observed Altitude.	HEIGHT OF THE EYE.												Observed Altitude.
	14 FEET.		15 FEET.		16 FEET.		17 FEET.		18 FEET.		19 FEET.		
	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	
6 30	4 26	11 43	4 17	11 51	4 9	11 59	4 2	12 6	3 55	12 13	3 49	12 20	6 30
40	4 37	11 32	4 28	11 40	4 20	11 48	4 13	11 55	4 6	12 2	4 0	12 9	40
50	4 47	11 22	4 39	11 30	4 31	11 38	4 24	11 45	4 17	11 52	4 11	11 59	50
7 0	4 57	11 12	4 49	11 20	4 41	11 28	4 34	11 35	4 27	11 42	4 20	11 49	7 0
10	5 7	11 2	4 59	11 10	4 51	11 18	4 44	11 25	4 37	11 32	4 30	11 39	10
20	5 16	10 53	5 8	11 1	5 0	11 9	4 53	11 16	4 46	11 23	4 39	11 30	20
7 30	5 25	10 44	5 17	10 52	5 9	11 0	5 2	11 7	4 55	11 14	4 48	11 21	7 30
40	5 34	10 35	5 26	10 43	5 18	10 51	5 11	10 58	5 4	11 5	4 57	11 12	40
50	5 42	10 27	5 34	10 35	5 26	10 43	5 19	10 50	5 12	10 57	5 5	11 4	50
8 0	5 50	10 19	5 42	10 27	5 34	10 35	5 27	10 42	5 20	10 49	5 13	10 56	8 0
10	5 57	10 12	5 49	10 20	5 41	10 28	5 34	10 35	5 27	10 42	5 20	10 49	10
20	6 4	10 5	5 56	10 13	5 48	10 21	5 41	10 28	5 34	10 35	5 27	10 42	20
8 30	6 11	9 58	6 3	10 6	5 55	10 14	5 48	10 21	5 41	10 28	5 34	10 35	8 30
40	6 18	9 51	6 10	10 9 59	6 2	10 7	5 55	10 14	5 48	10 21	5 41	10 28	40
50	6 25	9 44	6 17	9 52	6 9	10 0	6 2	10 7	5 55	10 14	5 48	10 21	50
9 0	6 31	9 38	6 23	9 46	6 15	9 54	6 8	10 1	6 1	10 8	5 54	10 15	9 0
20	6 44	9 24	6 36	9 32	6 28	9 40	6 21	9 47	6 14	9 54	6 7	10 1	20
40	6 55	9 13	6 47	9 21	6 39	9 29	6 32	9 36	6 25	9 43	6 18	9 50	40
10 0	7 5	9 3	6 57	9 11	6 49	9 19	6 42	9 26	6 35	9 33	6 28	9 40	10 0
20	7 15	8 53	7 7	9 1	6 59	9 9	6 52	9 16	6 45	9 23	6 38	9 30	20
40	7 25	8 43	7 17	8 51	7 9	8 59	7 2	9 6	6 55	9 13	6 48	9 20	40
11 0	7 34	8 34	7 26	8 42	7 18	8 50	7 11	8 57	7 4	9 4	6 57	9 11	11 0
30	7 46	8 22	7 38	8 30	7 30	8 38	7 23	8 45	7 16	8 52	7 9	8 59	30
12 0	7 58	8 10	7 50	8 18	7 42	8 26	7 35	8 33	7 28	8 40	7 21	8 47	12 0
12 30	8 8	8 0	8 0	8 8	7 52	8 16	7 45	8 23	7 38	8 30	7 31	8 37	12 30
13 0	8 18	7 50	8 10	7 58	8 2	8 6	7 55	8 13	7 48	8 20	7 41	8 27	13 0
30	8 27	7 41	8 19	7 49	8 11	7 57	8 4	8 4	7 57	8 11	7 50	8 18	30
14 0	8 36	7 32	8 28	7 40	8 20	7 48	8 13	7 55	8 6	8 2	7 59	8 9	14 0
15	8 52	7 16	8 44	7 24	8 36	7 32	8 29	7 39	8 22	7 46	8 15	7 53	15
16	9 6	7 2	8 58	7 10	8 50	7 18	8 43	7 25	8 36	7 32	8 29	7 39	16
17	9 18	6 50	9 10	6 58	9 2	7 6	8 55	7 13	8 48	7 20	8 41	7 26	17
18	9 28	6 40	9 20	6 48	9 12	6 56	9 5	7 3	8 58	7 10	8 51	7 17	18
19	9 38	6 30	9 30	6 38	9 22	6 46	9 15	6 53	9 8	7 0	9 1	7 7	19
20	9 47	6 21	9 39	6 29	9 31	6 37	9 24	6 44	9 17	6 51	9 10	6 58	20
22	10 3	6 5	9 55	6 13	9 47	6 21	9 40	6 28	9 33	6 35	9 26	6 42	22
24	10 16	5 52	10 8	6 0	10 0	6 8	9 53	6 15	9 46	6 22	9 39	6 28	24
26	10 27	5 41	10 19	5 49	10 11	5 57	10 4	6 4	9 57	6 11	9 50	6 17	26
28	10 37	5 31	10 29	5 39	10 21	5 47	10 14	5 54	10 7	6 1	10 0	6 7	28
30	10 45	5 22	10 37	5 30	10 29	5 38	10 22	5 45	10 15	5 52	10 8	5 58	30
32	10 54	5 14	10 47	5 21	10 39	5 29	10 31	5 37	10 24	5 44	10 18	5 50	32
34	11 1	5 7	10 53	5 14	10 45	5 22	10 37	5 30	10 30	5 37	10 24	5 43	34
36	11 7	5 1	10 59	5 8	10 51	5 16	10 43	5 24	10 36	5 31	10 30	5 37	36
38	11 13	4 55	11 5	5 2	10 57	5 10	10 49	5 18	10 42	5 25	10 36	5 31	38
40	11 17	4 50	11 9	4 57	11 1	5 5	10 53	5 13	10 46	5 20	10 40	5 26	40
45	11 28	4 39	11 20	4 46	11 12	4 54	11 4	5 2	10 57	5 9	10 51	5 15	45
50	11 36	4 30	11 29	4 37	11 21	4 45	11 13	4 53	11 6	5 0	11 0	5 6	50
55	11 43	4 22	11 36	4 29	11 28	4 37	11 20	4 45	11 13	4 52	11 7	4 58	55
60	11 50	4 15	11 43	4 22	11 35	4 30	11 27	4 38	11 20	4 45	11 14	4 51	60
65	11 56	4 8	11 49	4 15	11 41	4 23	11 33	4 31	11 26	4 38	11 20	4 44	65
70	12 1	4 2	11 54	4 9	11 46	4 17	11 38	4 25	11 31	4 32	11 25	4 38	70
75	12 6	3 56	11 59	4 3	11 51	4 11	11 43	4 19	11 36	4 26	11 30	4 32	75
80	12 10	3 51	12 3	3 58	11 55	4 6	11 47	4 14	11 40	4 21	11 34	4 27	80
85	12 15	3 46	12 7	3 53	11 59	4 1	11 51	4 9	11 44	4 16	11 38	4 22	85
90	12 19	3 41	12 11	3 48	12 3	3 56	11 55	4 4	11 48	4 11	11 42	4 17	90

Additional Correction for Sun's Altitude only.	Day of Month.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	1st to 15th	+18"	+14"	+8"	0"	- 8"	-13"	-14"	-11"	- 5"	+ 3"	+11"	+17"
	16th to 31st	+16	+12	+ 4	- 4	-11	-14	-13	- 8	- 1	+ 7	+14	+18

TABLE I.—ALTITUDE CORRECTION.

Observed Altitude.	HEIGHT OF THE EYE.												Observed Altitude.
	20 FEET.		21 FEET.		22 FEET.		23 FEET.		24 FEET.		25 FEET.		
	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	
	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	
6 0	3 42	12 27	3 35	12 34	3 29	12 40	3 23	12 46	3 17	12 52	3 11	12 58	6 0
40	3 53	12 16	3 46	12 23	3 40	12 29	3 34	12 35	3 28	12 41	3 22	12 47	40
50	4 4	12 6	3 57	12 13	3 51	12 19	3 45	12 25	3 39	12 31	3 33	12 37	50
7 0	4 13	11 56	4 6	12 3	4 0	12 9	3 54	12 15	3 48	12 21	3 42	12 27	7 0
10	4 23	11 46	4 16	11 53	4 10	11 59	4 4	12 5	3 58	12 11	3 52	12 17	10
20	4 32	11 37	4 25	11 44	4 19	11 50	4 13	11 56	4 7	12 2	4 1	12 8	20
7 30	4 41	11 28	4 34	11 35	4 28	11 41	4 22	11 47	4 16	11 53	4 10	11 59	7 30
40	4 50	11 19	4 43	11 26	4 37	11 32	4 31	11 38	4 25	11 44	4 19	11 50	40
50	4 58	11 11	4 51	11 18	4 45	11 24	4 39	11 30	4 33	11 36	4 27	11 42	50
8 0	5 6	11 3	4 59	11 10	4 53	11 16	4 47	11 22	4 41	11 28	4 35	11 34	8 0
10	5 13	10 56	5 6	11 3	5 0	11 9	4 54	11 15	4 48	11 21	4 42	11 27	10
20	5 20	10 49	5 13	10 56	5 7	11 2	5 1	11 8	4 55	11 14	4 49	11 20	20
8 30	5 27	10 42	5 20	10 49	5 14	10 55	5 8	11 1	5 2	11 7	4 56	11 13	8 30
40	5 34	10 35	5 27	10 42	5 21	10 48	5 15	10 54	5 9	11 0	5 3	11 6	40
50	5 41	10 28	5 34	10 35	5 28	10 41	5 22	10 47	5 16	10 53	5 10	10 59	50
9 0	5 47	10 22	5 40	10 29	5 34	10 35	5 28	10 41	5 23	10 46	5 17	10 52	9 0
20	6 0	10 8	5 53	10 15	5 47	10 21	5 41	10 27	5 35	10 33	5 29	10 39	20
40	6 11	9 57	6 4	10 4	5 58	10 10	5 52	10 16	5 46	10 22	5 40	10 28	40
10 0	6 21	9 47	6 14	9 54	6 8	10 0	6 2	10 6	5 56	10 12	5 50	10 18	10 0
20	6 31	9 37	6 24	9 44	6 18	9 50	6 12	9 56	6 6	10 2	6 0	10 8	20
40	6 41	9 27	6 34	9 34	6 28	9 40	6 22	9 46	6 16	9 52	6 10	9 58	40
11 0	6 50	9 18	6 43	9 25	6 37	9 31	6 31	9 37	6 25	9 43	6 19	9 49	11 0
30	7 2	9 6	6 55	9 13	6 49	9 19	6 43	9 25	6 37	9 31	6 31	9 37	30
12 0	7 14	8 54	7 7	9 1	7 1	9 7	6 55	9 13	6 49	9 19	6 43	9 25	12 0
12 30	7 24	8 44	7 17	8 51	7 11	8 57	7 5	9 3	6 59	9 9	6 53	9 15	12 30
13 0	7 34	8 34	7 27	8 41	7 21	8 47	7 15	8 53	7 9	8 59	7 3	9 5	13 0
30	7 43	8 25	7 36	8 32	7 30	8 38	7 24	8 44	7 18	8 50	7 12	8 56	30
14 0	7 52	8 16	7 45	8 23	7 39	8 29	7 33	8 35	7 27	8 41	7 21	8 47	14 0
15	8 8	8 0	8 1	8 7	7 55	8 13	7 50	8 18	7 44	8 24	7 38	8 30	15
16	8 22	7 46	8 15	7 53	8 9	7 59	8 4	8 5	7 58	8 11	7 52	8 17	16
17	8 34	7 33	8 28	7 40	8 21	7 46	8 16	7 52	8 10	7 58	8 4	8 4	17
18	8 45	7 24	8 38	7 30	8 32	7 36	8 27	7 42	8 21	7 48	8 15	7 54	18
19	8 55	7 14	8 48	7 20	8 42	7 26	8 37	7 32	8 31	7 38	8 25	7 44	19
20	9 5	7 4	8 58	7 10	8 52	7 16	8 46	7 23	8 40	7 29	8 34	7 35	20
22	9 19	6 47	9 13	6 54	9 7	7 0	9 2	7 6	8 56	7 12	8 50	7 18	22
24	9 32	6 34	9 26	6 40	9 20	6 46	9 15	6 53	9 9	6 59	9 3	7 5	24
26	9 43	6 23	9 37	6 29	9 31	6 35	9 26	6 42	9 20	6 48	9 14	6 54	26
28	9 53	6 13	9 47	6 19	9 41	6 25	9 36	6 32	9 30	6 38	9 24	6 44	28
30	10 1	6 4	9 55	6 10	9 49	6 16	9 44	6 24	9 38	6 30	9 32	6 36	30
32	10 11	5 57	10 4	6 4	9 58	6 10	9 52	6 16	9 46	6 22	9 40	6 28	32
34	10 18	5 50	10 11	5 57	10 5	6 3	9 59	6 9	9 53	6 15	9 47	6 21	34
36	10 24	5 44	10 17	5 51	10 11	5 57	10 5	6 3	9 59	6 9	9 53	6 15	36
38	10 30	5 38	10 23	5 45	10 17	5 51	10 11	5 57	10 5	6 3	9 59	6 9	38
40	10 34	5 33	10 27	5 40	10 21	5 46	10 15	5 52	10 9	5 58	10 3	6 4	40
45	10 45	5 22	10 38	5 29	10 32	5 35	10 25	5 41	10 19	5 47	10 13	5 53	45
50	10 53	5 13	10 46	5 20	10 40	5 26	10 34	5 32	10 28	5 38	10 22	5 44	50
55	11 0	5 5	10 53	5 12	10 47	5 18	10 41	5 24	10 35	5 30	10 29	5 36	55
60	11 7	4 58	11 0	5 5	10 54	5 11	10 48	5 17	10 42	5 23	10 36	5 29	60
65	11 13	4 51	11 6	4 58	11 0	5 4	10 54	5 10	10 48	5 16	10 42	5 22	65
70	11 18	4 45	11 11	4 52	11 5	4 58	10 59	5 4	10 53	5 10	10 47	5 16	70
75	11 23	4 39	11 16	4 46	11 10	4 52	11 4	4 58	10 58	5 4	10 52	5 10	75
80	11 27	4 34	11 20	4 41	11 14	4 47	11 8	4 53	11 2	4 59	10 56	5 5	80
85	11 32	4 29	11 25	4 36	11 19	4 42	11 13	4 48	11 7	4 54	11 1	5 0	85
90	11 36	4 24	11 29	4 31	11 23	4 37	11 17	4 43	11 11	4 49	11 5	4 55	90

Additional Correction for Sun's Altitude only.	Day of Month.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	1st to 15th	+18"	+14"	+8"	0"	- 8"	-13"	-14"	-11"	- 5"	+ 3"	+11"	+17"
	16th to 31st	+16	+12	+4	- 4	-11	-14	-13	- 8	- 1	+ 7	+14	+18

TABLE I.—ALTITUDE CORRECTION.

Observed Altitude.	HEIGHT OF THE EYE.												Observed Altitude.
	26 FEET.		27 FEET.		28 FEET.		29 FEET.		30 FEET.		31 FEET.		
	Sun's Correc- tion. ○	Star's Correc- tion. *	Sun's Correc- tion. ○	Star's Correc- tion. *	Sun's Correc- tion. ○	Star's Correc- tion. *	Sun's Correc- tion. ○	Star's Correc- tion. *	Sun's Correc- tion. ○	Star's Correc- tion. *	Sun's Correc- tion. ○	Star's Correc- tion. *	
	<i>add.</i>	<i>subtract.</i>	<i>add.</i>	<i>subtract.</i>	<i>add.</i>	<i>subtract.</i>	<i>add.</i>	<i>subtract.</i>	<i>add.</i>	<i>subtract.</i>	<i>add.</i>	<i>subtract.</i>	
6 30	3 5	13 4	2 59	13 10	2 52	13 16	2 46	13 22	2 40	13 28	2 35	13 33	6 30
40	3 16	12 53	3 10	12 59	3 3	13 5	2 57	13 11	2 51	13 17	2 46	13 22	40
50	3 26	12 43	3 20	12 49	3 14	12 55	3 8	13 1	3 2	13 7	2 57	13 12	50
7 0	3 36	12 33	3 30	12 39	3 24	12 45	3 18	12 51	3 12	12 57	3 7	13 2	7 0
10	3 46	12 23	3 40	12 29	3 34	12 35	3 28	12 41	3 22	12 47	3 17	12 52	10
20	3 55	12 14	3 49	12 20	3 43	12 26	3 37	12 32	3 31	12 38	3 26	12 43	20
7 30	4 4	12 5	3 58	12 11	3 52	12 17	3 46	12 23	3 40	12 29	3 35	12 34	7 30
40	4 13	11 56	4 7	12 2	4 1	12 8	3 55	12 14	3 49	12 20	3 44	12 25	40
50	4 21	11 48	4 15	11 54	4 9	12 0	4 3	12 6	3 57	12 12	3 52	12 17	50
8 0	4 29	11 40	4 23	11 46	4 17	11 52	4 11	11 58	4 5	12 4	4 0	12 9	8 0
10	4 36	11 33	4 30	11 39	4 24	11 45	4 18	11 51	4 12	11 57	4 7	12 2	10
20	4 43	11 26	4 37	11 32	4 31	11 38	4 25	11 44	4 19	11 50	4 14	11 55	20
8 30	4 50	11 19	4 44	11 25	4 38	11 31	4 32	11 37	4 26	11 43	4 21	11 48	8 30
40	4 57	11 12	4 51	11 18	4 45	11 24	4 39	11 30	4 33	11 36	4 28	11 41	40
50	5 4	11 5	4 58	11 11	4 52	11 17	4 46	11 23	4 40	11 29	4 35	11 34	50
9 0	5 11	10 58	5 5	11 4	4 59	11 10	4 53	11 16	4 47	11 22	4 43	11 26	9 0
20	5 23	10 45	5 17	10 51	5 11	10 57	5 5	11 3	4 59	11 9	4 55	11 13	20
40	5 34	10 34	5 28	10 40	5 22	10 46	5 16	10 52	5 11	10 57	5 6	11 2	40
10 0	5 44	10 24	5 38	10 30	5 33	10 36	5 27	10 42	5 22	10 47	5 17	10 52	10 0
20	5 54	10 14	5 48	10 20	5 43	10 26	5 37	10 32	5 32	10 37	5 27	10 42	20
40	6 4	10 4	5 58	10 10	5 53	10 16	5 47	10 22	5 42	10 27	5 37	10 32	40
11 0	6 13	9 55	6 7	10 1	6 2	10 7	5 56	10 13	5 51	10 18	5 46	10 23	11 0
30	6 25	9 43	6 19	9 49	6 14	9 55	6 8	10 1	6 3	10 6	5 58	10 11	30
40	6 37	9 31	6 31	9 37	6 26	9 43	6 20	9 49	6 15	9 55	6 10	9 59	40
12 30	6 47	9 21	6 41	9 27	6 36	9 33	6 30	9 39	6 25	9 45	6 20	9 48	12 30
13 0	6 57	9 11	6 51	9 17	6 46	9 23	6 40	9 29	6 35	9 35	6 30	9 38	13 0
30	7 6	9 2	7 0	9 8	6 55	9 14	6 49	9 20	6 44	9 25	6 39	9 29	30
14 0	7 15	8 53	7 9	8 59	7 4	9 4	6 58	9 10	6 53	9 16	6 48	9 20	14 0
15	7 32	8 36	7 26	8 42	7 19	8 48	7 13	8 54	7 8	9 0	7 4	9 5	15
16	7 46	8 23	7 40	8 29	7 33	8 35	7 27	8 41	7 22	8 47	7 18	8 51	16
17	7 58	8 10	7 52	8 16	7 45	8 22	7 39	8 28	7 34	8 34	7 30	8 38	17
18	8 9	8 0	8 3	8 6	7 56	8 12	7 50	8 18	7 45	8 24	7 41	8 27	18
19	8 19	7 50	8 13	7 56	8 7	8 2	8 1	8 8	7 55	8 14	7 51	8 17	19
20	8 28	7 41	8 22	7 47	8 16	7 53	8 10	7 59	8 4	8 4	8 0	8 8	20
22	8 44	7 24	8 38	7 30	8 32	7 36	8 26	7 42	8 21	7 47	8 15	7 53	22
24	8 57	7 11	8 51	7 17	8 45	7 23	8 39	7 29	8 34	7 34	8 28	7 40	24
26	9 8	7 0	9 2	7 6	8 56	7 12	8 50	7 18	8 45	7 23	8 39	7 29	26
28	9 18	6 50	9 12	6 56	9 6	7 2	9 0	7 8	8 55	7 13	8 49	7 19	28
30	9 26	6 42	9 20	6 48	9 14	6 54	9 8	7 0	9 3	7 5	8 57	7 10	30
32	9 34	6 34	9 28	6 40	9 22	6 46	9 16	6 52	9 11	6 57	9 5	7 3	32
34	9 41	6 27	9 35	6 33	9 29	6 39	9 23	6 45	9 18	6 50	9 11	6 56	34
36	9 47	6 21	9 41	6 27	9 35	6 33	9 29	6 39	9 24	6 44	9 17	6 50	36
38	9 53	6 15	9 47	6 21	9 41	6 27	9 35	6 33	9 30	6 38	9 23	6 44	38
40	9 57	6 10	9 51	6 16	9 45	6 22	9 39	6 28	9 34	6 33	9 27	6 39	40
45	10 7	5 59	10 1	6 5	9 55	6 11	9 49	6 17	9 44	6 22	9 38	6 28	45
50	10 16	5 50	10 10	5 56	10 4	6 2	9 58	6 8	9 53	6 13	9 47	6 19	50
55	10 23	5 42	10 17	5 48	10 11	5 54	10 5	6 0	10 0	6 5	9 54	6 11	55
60	10 30	5 35	10 24	5 41	10 18	5 47	10 12	5 53	10 7	5 58	10 1	6 4	60
65	10 36	5 28	10 30	5 34	10 24	5 40	10 18	5 46	10 13	5 51	10 7	5 57	65
70	10 41	5 22	10 35	5 28	10 29	5 34	10 23	5 40	10 18	5 45	10 12	5 51	70
75	10 46	5 16	10 40	5 22	10 34	5 28	10 28	5 34	10 23	5 39	10 17	5 45	75
80	10 50	5 11	10 44	5 17	10 38	5 23	10 32	5 29	10 27	5 34	10 21	5 40	80
85	10 55	5 6	10 49	5 12	10 43	5 18	10 37	5 24	10 32	5 29	10 26	5 35	85
90	10 59	5 1	10 53	5 7	10 47	5 13	10 41	5 19	10 36	5 24	10 30	5 30	90

Additional Correction for Sun's Altitude only.	Day of Month.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	1st to 15th	+18"	+14"	+8"	0'	- 8"	-13"	-14"	-11"	-5"	+3"	+11"	+17"
	16th to 31st	+16	+12	+4	-4	-11	-14	-13	- 8	- 1	+7	+14	+18

TABLE I.—ALTITUDE CORRECTION.

Observed Altitude.	HEIGHT OF THE EYE.												Observed Altitude.
	32 FEET.		33 FEET.		34 FEET.		35 FEET.		36 FEET.		37 FEET.		
	Sun's Correc- tion. ⊙ *	Star's Correc- tion. ⊙ *	Sun's Correc- tion. ⊙ *	Star's Correc- tion. ⊙ *	Sun's Correc- tion. ⊙ *	Star's Correc- tion. ⊙ *	Sun's Correc- tion. ⊙ *	Star's Correc- tion. ⊙ *	Sun's Correc- tion. ⊙ *	Star's Correc- tion. ⊙ *	Sun's Correc- tion. ⊙ *	Star's Correc- tion. ⊙ *	
	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	
6 30	2 40	13 38	2 25	13 43	2 20	13 48	2 15	13 53	2 10	13 58	2 5	14 3	6 30
40	2 31	13 27	2 30	13 32	2 31	13 37	2 26	13 42	2 21	13 47	2 16	13 52	40
50	2 52	13 17	2 47	13 22	2 42	13 27	2 37	13 32	2 32	13 37	2 27	13 42	50
7 0	3 2	13 7	2 57	13 12	2 52	13 17	2 47	13 22	2 42	13 27	2 37	13 32	7 0
10	3 12	12 57	3 7	13 2	3 2	13 7	2 57	13 12	2 52	13 17	2 47	13 22	10
20	3 21	12 48	3 16	12 53	3 11	12 58	3 6	13 3	3 1	13 8	2 56	13 13	20
7 30	3 30	12 39	3 25	12 44	3 20	12 49	3 15	12 54	3 10	12 59	3 5	13 4	7 30
40	3 39	12 30	3 34	12 35	3 29	12 40	3 24	12 45	3 19	12 50	3 14	12 55	40
50	3 47	12 22	3 42	12 27	3 37	12 32	3 32	12 37	3 27	12 42	3 22	12 47	50
8 0	3 55	12 14	3 50	12 19	3 45	12 24	3 40	12 29	3 35	12 34	3 30	12 39	8 0
10	4 2	12 7	3 57	12 12	3 52	12 17	3 47	12 22	3 42	12 27	3 37	12 32	10
20	4 9	12 0	4 4	12 5	3 59	12 10	3 54	12 15	3 49	12 20	3 44	12 25	20
8 30	4 16	11 53	4 11	11 58	4 6	12 3	4 1	12 8	3 56	12 13	3 51	12 18	8 30
40	4 23	11 40	4 18	11 51	4 13	11 56	4 8	12 1	4 3	12 6	3 58	12 11	40
50	4 30	11 39	4 25	11 44	4 20	11 49	4 15	11 54	4 10	11 59	4 5	12 4	50
9 0	4 38	11 32	4 32	11 37	4 27	11 42	4 22	11 47	4 17	11 52	4 12	11 57	9 0
20	4 50	11 18	4 45	11 23	4 40	11 28	4 35	11 33	4 30	11 38	4 25	11 43	20
40	5 1	11 7	4 56	11 12	4 51	11 17	4 46	11 22	4 41	11 27	4 36	11 32	40
10 0	5 12	10 57	5 7	11 2	5 2	11 7	4 57	11 12	4 52	11 17	4 47	11 22	10 0
20	5 22	10 47	5 17	10 52	5 12	10 57	5 7	11 2	5 2	11 7	4 57	11 12	20
40	5 32	10 37	5 27	10 42	5 22	10 47	5 17	10 52	5 12	10 57	5 7	11 2	40
11 0	5 41	10 28	5 36	10 33	5 31	10 38	5 26	10 43	5 21	10 48	5 16	10 53	11 0
30	5 53	10 16	5 48	10 21	5 43	10 26	5 38	10 31	5 33	10 36	5 28	10 41	30
12 0	6 5	10 4	6 0	10 9	5 55	10 14	5 50	10 19	5 45	10 24	5 40	10 29	12 0
12 30	6 15	9 53	6 10	9 58	6 5	10 3	6 0	10 8	5 55	10 13	5 50	10 18	12 30
13 0	6 25	9 43	6 20	9 48	6 15	9 53	6 10	9 58	6 5	10 3	6 0	10 8	13 0
30	6 34	9 34	6 29	9 39	6 24	9 44	6 19	9 49	6 14	9 54	6 9	9 59	30
14 0	6 43	9 25	6 38	9 30	6 33	9 35	6 28	9 40	6 23	9 45	6 18	9 50	14 0
15	6 59	9 10	6 54	9 15	6 49	9 20	6 44	9 25	6 39	9 30	6 34	9 35	15
16	7 13	8 56	7 8	9 1	7 3	9 6	6 58	9 11	6 53	9 16	6 48	9 21	16
17	7 25	8 43	7 20	8 48	7 15	8 53	7 10	8 58	7 5	9 3	7 0	9 8	17
18	7 36	8 32	7 31	8 37	7 20	8 42	7 21	8 47	7 16	8 52	7 11	8 57	18
19	7 46	8 22	7 41	8 27	7 36	8 32	7 31	8 37	7 26	8 42	7 21	8 47	19
20	7 55	8 13	7 50	8 18	7 45	8 23	7 40	8 28	7 35	8 33	7 30	8 38	20
22	8 10	7 58	8 5	8 3	8 0	8 8	7 55	8 13	7 50	8 18	7 45	8 23	22
24	8 23	7 45	8 18	7 50	8 13	7 55	8 8	8 0	8 3	8 5	7 58	8 10	24
26	8 34	7 34	8 29	7 39	8 24	7 44	8 19	7 49	8 14	7 54	8 9	7 59	26
28	8 44	7 24	8 39	7 29	8 34	7 34	8 29	7 39	8 24	7 44	8 19	7 49	28
30	8 52	7 15	8 47	7 20	8 42	7 25	8 37	7 30	8 32	7 35	8 27	7 40	30
32	9 0	7 8	8 55	7 13	8 50	7 18	8 45	7 23	8 40	7 28	8 35	7 33	32
34	9 6	7 1	9 1	7 6	8 56	7 11	8 51	7 16	8 46	7 21	8 41	7 26	34
36	9 12	6 55	9 7	7 0	9 2	7 5	8 57	7 10	8 52	7 15	8 47	7 20	36
38	9 18	6 49	9 13	6 54	9 8	6 59	9 3	7 4	8 58	7 9	8 53	7 14	38
40	9 22	6 44	9 17	6 49	9 12	6 54	9 7	6 59	9 2	7 4	8 57	7 9	40
45	9 33	6 33	9 28	6 38	9 23	6 43	9 18	6 49	9 13	6 53	9 8	6 58	45
50	9 42	6 24	9 37	6 29	9 32	6 34	9 27	6 39	9 22	6 44	9 17	6 49	50
55	9 49	6 16	9 44	6 21	9 39	6 26	9 34	6 31	9 29	6 36	9 24	6 41	55
60	9 56	6 9	9 51	6 14	9 46	6 19	9 41	6 24	9 36	6 29	9 31	6 34	60
65	10 2	6 2	9 57	6 7	9 52	6 12	9 47	6 17	9 42	6 22	9 37	6 27	65
70	10 7	5 56	10 2	6 1	9 57	6 6	9 52	6 11	9 47	6 16	9 42	6 21	70
75	10 12	5 50	10 7	5 55	10 2	6 0	9 57	6 5	9 52	6 10	9 47	6 15	75
80	10 16	5 45	10 11	5 50	10 6	5 55	10 1	6 0	9 56	6 5	9 51	6 10	80
85	10 21	5 40	10 16	5 45	10 11	5 50	10 6	5 55	10 1	6 0	9 56	6 5	85
90	10 25	5 35	10 20	5 40	10 15	5 45	10 10	5 50	10 5	5 55	10 0	6 0	90

Additional Correction for Sun's Altitude only.	Day of Month.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	1st to 15th	+18"	+14"	+8"	0"	- 8"	-13"	-14"	-11"	-5"	+3"	+11"	+17"
	16th to 31st	+16	+12	+4	-4	-11	-14	-13	- 8	- 1	+7	+14	+18

TABLE I.—ALTIUDE CORRECTION.

Observed Altitude.	HEIGHT OF THE EYE.												Observed Altitude.
	38 FEET.		39 FEET.		40 FEET.		41 FEET.		42 FEET.		43 FEET.		
	Sun's Correc- tion. ☉	Star's Correc- tion. *	Sun's Correc- tion. ☉	Star's Correc- tion. *	Sun's Correc- tion. ☉	Star's Correc- tion. *	Sun's Correc- tion. ☉	Star's Correc- tion. *	Sun's Correc- tion. ☉	Star's Correc- tion. *	Sun's Correc- tion. ☉	Star's Correc- tion. *	
	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	add.	subtract.	
6 30	2 0	14 9	1 55	14 14	1 50	14 19	1 46	14 23	1 41	14 28	1 37	14 32	6 30
40	2 11	13 58	2 6	14 3	2 1	14 8	1 57	14 12	1 52	14 17	1 48	14 21	40
50	2 22	13 48	2 17	13 53	2 12	13 58	2 8	14 2	2 3	14 7	1 59	14 11	50
7 0	2 32	13 38	2 27	13 43	2 22	13 48	2 18	13 52	2 13	13 57	2 9	14 1	7 0
10	2 42	13 28	2 37	13 33	2 32	13 38	2 28	13 42	2 23	13 47	2 19	13 51	10
20	2 51	13 18	2 46	13 23	2 41	13 28	2 37	13 32	2 32	13 37	2 28	13 41	20
7 30	3 0	13 8	2 55	13 13	2 50	13 18	2 46	13 22	2 41	13 27	2 37	13 31	7 30
40	3 9	12 59	3 4	13 4	2 59	13 9	2 55	13 13	2 50	13 18	2 46	13 22	40
50	3 17	12 51	3 12	12 56	3 7	13 1	3 3	13 5	2 58	13 10	2 54	13 14	50
8 0	3 25	12 44	3 20	12 49	3 15	12 54	3 11	12 58	3 6	13 3	3 2	13 7	8 0
10	3 32	12 37	3 27	12 42	3 22	12 47	3 18	12 51	3 13	12 56	3 9	13 0	10
20	3 39	12 30	3 34	12 35	3 29	12 40	3 25	12 44	3 20	12 49	3 16	12 53	20
8 30	3 47	12 22	3 42	12 27	3 37	12 32	3 33	12 36	3 28	12 42	3 23	12 46	8 30
40	3 54	12 15	3 49	12 20	3 44	12 25	3 39	12 29	3 34	12 34	3 30	12 38	40
50	4 1	12 8	3 56	12 13	3 51	12 18	3 46	12 22	3 41	12 27	3 37	12 31	50
9 0	4 7	12 2	4 2	12 7	3 57	12 12	3 52	12 16	3 48	12 21	3 44	12 25	9 0
20	4 19	11 50	4 14	11 55	4 9	12 0	4 4	12 4	4 0	12 9	3 56	12 13	20
40	4 31	11 38	4 26	11 43	4 21	11 48	4 16	11 52	4 12	11 57	4 8	12 1	40
10 0	4 42	11 27	4 37	11 32	4 32	11 37	4 28	11 41	4 23	11 46	4 19	11 50	10 0
20	4 52	11 17	4 47	11 22	4 42	11 27	4 38	11 31	4 33	11 36	4 29	11 40	20
40	5 2	11 7	4 57	11 12	4 52	11 17	4 48	11 21	4 43	11 26	4 39	11 30	40
11 0	5 11	10 58	5 6	11 3	5 1	11 8	4 57	11 12	4 52	11 17	4 48	11 21	11 0
30	5 23	10 46	5 18	10 51	5 13	10 56	5 9	11 0	5 4	11 5	5 0	11 9	30
12 0	5 35	10 34	5 30	10 39	5 25	10 44	5 21	10 48	5 16	10 53	5 12	10 57	12 0
12 30	5 45	10 23	5 40	10 28	5 35	10 33	5 31	10 37	5 26	10 42	5 22	10 46	12 30
13 0	5 55	10 13	5 50	10 18	5 45	10 23	5 41	10 27	5 36	10 32	5 32	10 36	13 0
30	6 4	10 4	5 59	10 9	5 54	10 14	5 50	10 18	5 45	10 23	5 41	10 27	30
14 0	6 13	9 55	6 8	10 0	6 3	10 5	5 59	10 9	5 54	10 14	5 50	10 18	14 0
15	6 29	9 39	6 24	9 44	6 19	9 49	6 15	9 53	6 10	9 58	6 6	10 2	15
16	6 43	9 25	6 38	9 30	6 33	9 35	6 29	9 39	6 24	9 44	6 20	9 48	16
17	6 55	9 13	6 50	9 18	6 45	9 23	6 41	9 27	6 36	9 32	6 32	9 36	17
18	7 6	9 2	7 1	9 7	6 56	9 12	6 52	9 16	6 47	9 21	6 43	9 25	18
19	7 16	8 52	7 11	8 57	7 6	9 2	7 2	9 6	6 57	9 11	6 53	9 15	19
20	7 25	8 43	7 20	8 48	7 15	8 53	7 11	8 57	7 6	9 2	7 2	9 6	20
22	7 40	8 28	7 35	8 33	7 30	8 38	7 26	8 42	7 21	8 47	7 17	8 51	22
24	7 53	8 15	7 48	8 20	7 43	8 25	7 39	8 29	7 34	8 34	7 30	8 38	24
26	8 4	8 3	7 59	8 8	7 54	8 13	7 51	8 17	7 45	8 22	7 41	8 26	26
28	8 14	7 54	8 9	7 59	8 4	8 4	8 0	8 8	7 55	8 13	7 51	8 17	28
30	8 23	7 45	8 18	7 50	8 13	7 55	8 9	7 59	8 4	8 4	8 0	8 8	30
32	8 31	7 37	8 26	7 42	8 21	7 47	8 17	7 51	8 12	7 56	8 8	8 1	32
34	8 38	7 30	8 33	7 35	8 28	7 40	8 24	7 44	8 19	7 49	8 15	7 54	34
36	8 43	7 24	8 38	7 29	8 33	7 34	8 29	7 38	8 24	7 43	8 20	7 48	36
38	8 48	7 18	8 43	7 23	8 38	7 28	8 34	7 32	8 29	7 37	8 25	7 42	38
40	8 53	7 13	8 48	7 18	8 43	7 23	8 39	7 27	8 34	7 32	8 30	7 37	40
45	9 4	7 2	8 59	7 7	8 54	7 12	8 50	7 16	8 45	7 21	8 41	7 26	45
50	9 13	6 53	9 8	6 58	9 3	7 3	8 59	7 7	8 54	7 12	8 50	7 16	50
55	9 20	6 45	9 15	6 50	9 10	6 55	9 6	6 59	9 1	7 4	8 57	7 8	55
60	9 27	6 38	9 22	6 43	9 17	6 48	9 13	6 52	9 8	6 57	9 4	7 1	60
65	9 33	6 31	9 28	6 36	9 23	6 41	9 19	6 45	9 14	6 50	9 10	6 54	65
70	9 38	6 25	9 33	6 30	9 28	6 35	9 24	6 39	9 19	6 44	9 15	6 49	70
75	9 43	6 19	9 38	6 24	9 33	6 29	9 29	6 33	9 24	6 38	9 20	6 43	75
80	9 47	6 14	9 42	6 19	9 37	6 24	9 33	6 28	9 28	6 33	9 24	6 38	80
85	9 52	6 9	9 47	6 14	9 42	6 19	9 38	6 23	9 33	6 28	9 29	6 33	85
90	9 56	6 4	9 51	6 9	9 46	6 14	9 42	6 18	9 37	6 23	9 33	6 28	90

Additional Correction for Sun's Altitude only.	Day of Month.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	1st to 15th	+18"	+14"	+8"	0"	-8"	-13"	-14"	-11"	-5"	+3"	+11"	+17"
16th to 31st	+16	+12	+4	-4	-11	-14	-13	-8	-1	+7	+14	+18	

TABLE I.—ALTITUDE CORRECTION.

Observed Altitude.	HEIGHT OF THE EYE.												Observed Altitude.
	44 F ET.		45 FEET.		46 FEET.		47 FEET.		48 FEET.		49 FEET.		
	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	Sun's Correc- tion. ⊙	Star's Correc- tion. *	
	<i>add.</i>	<i>subtract.</i>	<i>add.</i>	<i>subtract.</i>	<i>add.</i>	<i>subtract.</i>	<i>add.</i>	<i>subtract.</i>	<i>add.</i>	<i>subtract.</i>	<i>add.</i>	<i>subtract.</i>	
6 30	1 31	14 38	1 26	14 43	1 22	14 47	1 18	14 51	1 13	14 56	1 9	15 0	6 30
40	1 42	14 27	1 37	14 32	1 33	14 36	1 29	14 40	1 24	14 45	1 20	14 49	40
50	1 53	14 17	1 48	14 22	1 44	14 26	1 40	14 30	1 35	14 35	1 31	14 39	50
7 0	2 3	14 7	1 58	14 12	1 54	14 16	1 50	14 20	1 45	14 25	1 41	14 29	7 0
10	2 13	13 57	2 8	14 2	2 4	14 6	2 0	14 10	1 55	14 15	1 51	14 19	10
20	2 22	13 47	2 17	13 51	2 13	13 55	2 9	13 59	2 4	14 4	2 0	14 9	20
7 30	2 31	13 37	2 27	13 41	2 23	13 45	2 19	13 49	2 14	13 54	2 9	13 59	7 30
40	2 41	13 27	2 36	13 31	2 32	13 36	2 28	13 40	2 23	13 45	2 18	13 50	40
50	2 49	13 19	2 44	13 23	2 40	13 27	2 36	13 31	2 31	13 36	2 27	13 41	50
8 0	2 56	13 13	2 52	13 17	2 47	13 21	2 43	13 25	2 38	13 30	2 34	13 34	8 0
10	3 4	13 5	2 59	13 9	2 55	13 13	2 51	13 17	2 46	13 22	2 42	13 26	10
20	3 11	12 58	3 6	13 2	3 2	13 6	2 58	13 10	2 53	13 15	2 49	13 19	20
8 30	3 18	12 51	3 13	12 55	3 9	12 59	3 5	13 3	3 0	13 8	2 56	13 13	8 30
40	3 25	12 43	3 20	12 47	3 16	12 52	3 12	12 56	3 7	13 1	3 3	13 6	40
50	3 32	12 36	3 28	12 40	3 23	12 45	3 19	12 49	3 14	12 54	3 10	12 59	50
9 0	3 39	12 30	3 35	12 34	3 30	12 39	3 26	12 43	3 21	12 48	3 17	12 52	9 0
20	3 51	12 18	3 47	12 22	3 42	12 27	3 38	12 31	3 33	12 36	3 29	12 40	20
40	4 3	12 6	3 59	12 10	3 54	12 15	3 50	12 19	3 45	12 24	3 41	12 28	40
10 0	4 14	11 55	4 10	11 59	4 5	12 4	4 1	12 8	3 56	12 13	3 52	12 17	10 0
20	4 24	11 45	4 20	11 49	4 15	11 54	4 11	11 58	4 6	12 3	4 2	12 7	20
40	4 34	11 35	4 30	11 39	4 25	11 44	4 21	11 48	4 16	11 53	4 12	11 57	40
11 0	4 43	11 26	4 39	11 30	4 34	11 35	4 30	11 39	4 25	11 44	4 21	11 48	11 0
30	4 55	11 14	4 51	11 18	4 46	11 23	4 42	11 27	4 37	11 32	4 33	11 36	30
12 0	5 7	11 2	5 3	11 6	4 58	11 11	4 54	11 15	4 49	11 20	4 45	11 24	12 0
12 30	5 17	10 51	5 13	10 55	5 8	11 0	5 4	11 4	4 59	11 9	4 55	11 13	12 30
13 0	5 27	10 41	5 23	10 45	5 18	10 50	5 14	10 54	5 9	10 59	5 5	11 3	13 0
30	5 36	10 32	5 32	10 36	5 27	10 41	5 23	10 45	5 18	10 50	5 14	10 54	30
14 0	5 45	10 23	5 41	10 27	5 36	10 32	5 32	10 36	5 27	10 41	5 23	10 45	14 0
15	6 1	10 7	5 57	10 11	5 52	10 16	5 48	10 20	5 43	10 25	5 39	10 29	15
16	6 15	9 53	6 11	9 57	6 6	10 2	6 2	10 6	5 57	10 11	5 53	10 15	16
17	6 27	9 41	6 23	9 45	6 18	9 50	6 14	9 54	6 9	9 59	6 5	10 3	17
18	6 38	9 30	6 34	9 34	6 29	9 39	6 25	9 43	6 20	9 48	6 16	9 52	18
19	6 48	9 20	6 44	9 24	6 39	9 29	6 35	9 33	6 30	9 38	6 26	9 42	19
20	6 57	9 11	6 53	9 15	6 48	9 20	6 44	9 24	6 39	9 29	6 35	9 33	20
22	7 12	8 56	7 8	8 0	7 3	9 5	6 59	9 9	6 54	9 14	6 50	9 18	22
24	7 25	8 43	7 21	8 47	7 16	8 52	7 12	8 56	7 7	9 1	7 3	9 5	24
26	7 37	8 31	7 33	8 37	7 28	8 42	7 24	8 45	7 19	8 50	7 15	8 54	26
28	7 46	8 22	7 42	8 26	7 37	8 31	7 33	8 35	7 28	8 40	7 24	8 44	28
30	7 55	8 13	7 51	8 17	7 46	8 22	7 42	8 26	7 37	8 31	7 33	8 35	30
32	8 3	8 5	7 59	8 9	7 54	8 14	7 50	8 18	7 45	8 23	7 41	8 27	32
34	8 10	7 58	8 6	8 2	8 1	8 7	7 57	8 11	7 52	8 16	7 48	8 20	34
36	8 15	7 52	8 11	7 56	8 6	8 1	8 2	8 5	7 57	8 10	7 53	8 14	36
38	8 20	7 46	8 16	7 50	8 11	7 55	8 7	7 59	8 2	8 4	7 58	8 8	38
40	8 25	7 41	8 21	7 45	8 16	7 50	8 12	7 54	8 7	7 59	8 3	8 3	40
45	8 36	7 30	8 32	7 34	8 27	7 39	8 23	7 43	8 18	7 48	8 14	7 52	45
50	8 45	7 21	8 41	7 25	8 36	7 30	8 32	7 34	8 27	7 39	8 23	7 43	50
55	8 52	7 13	8 48	7 17	8 43	7 22	8 39	7 26	8 34	7 31	8 30	7 35	55
60	8 59	7 6	8 55	7 10	8 50	7 15	8 46	7 19	8 41	7 24	8 37	7 28	60
65	9 5	6 59	9 1	7 3	8 56	7 8	8 52	7 12	8 47	7 17	8 43	7 21	65
70	9 10	6 53	9 6	6 57	9 1	7 2	8 57	7 6	8 52	7 11	8 45	7 15	70
75	9 15	6 47	9 11	6 51	9 6	6 56	9 2	7 0	8 57	7 5	8 53	7 9	75
80	9 19	6 42	9 15	6 46	9 10	6 51	9 6	6 55	9 1	7 0	8 57	7 4	80
85	9 24	6 37	9 20	6 41	9 15	6 46	9 11	6 50	9 6	6 55	9 2	6 59	85
90	9 28	6 32	9 24	6 36	9 19	6 41	9 15	6 45	9 10	6 50	9 6	6 54	90

Additional Correction for Sun's Altitude only.	Day of Month.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	1st to 15th	+18"	+14"	+ 8"	0	- 8"	-13"	-14"	-11"	- 5"	+ 3"	+11"	+17"
16th to 31st	+16	+12	+ 4	- 4	-11	-14	-13	- 8	- 1	+ 7	+14	+18	

TABLE III

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	0° 0'	0° 30'	1° 0'	1° 30'	2° 0'	2° 30'	3° 0'	3° 30'	4° 0'	4° 30'	5° 0'	5° 30'	
0° 0'	"	"	"	"	"	"	37.47	32.10	28.08	24.95	22.44	20.39	0° 0'
30								37.45	32.08	28.06	24.93	22.42	30
1° 0'									37.42	32.06	28.04	24.91	1° 0'
30										37.38	32.03	28.01	30
2° 0'						Altitude	above	87°					2° 0'
30													30
3° 0'	37.47												3° 0'
30	32.10	37.45											30
4° 0'	28.08	32.08	37.42										4° 0'
30	24.95	28.06	32.06	37.38									30
5° 0'	22.44	24.93	28.04	32.03	37.35								5° 0'
30	20.39	22.42	24.91	28.01	32.00	37.31							30
6° 0'	18.68	20.37	22.40	24.88	27.98	31.96	37.26						6° 0'
30	17.23	18.66	20.35	22.37	24.85	27.94	31.91	37.21					30
7° 0'	15.99	17.21	18.64	20.32	22.35	24.82	27.90	31.86					7° 0'
30	14.92	15.97	17.19	18.61	20.30	22.32	24.78	27.86	37.15	37.08			30
8° 0'	13.97	14.90	15.95	17.16	18.59	20.27	22.28	24.74	27.81	31.75	37.01		8° 0'
30	13.14	13.95	14.88	15.92	17.14	18.56	20.23	22.24	24.69	27.76	31.69	36.93	30
9° 0'	12.40	13.12	13.93	14.85	15.90	17.11	18.53	20.21	22.20	24.64	27.70	31.62	9° 0'
30	11.73	12.38	13.10	13.91	14.83	15.87	17.08	18.49	20.16	22.15	24.59	27.64	30
10° 0'	11.14	11.72	12.36	13.07	13.89	14.80	15.84	17.05	18.45	20.12	22.10	24.53	10° 0'
30	10.60	11.12	11.70	12.33	13.05	13.86	14.77	15.81	17.01	18.41	20.07	22.05	30
11° 0'	10.10	10.58	11.10	11.67	12.31	13.03	13.83	14.74	15.78	16.97	18.37	20.02	11° 0'
30	9.65	10.08	10.56	11.07	11.65	12.29	13.00	13.80	14.71	15.74	16.93	18.32	30
12° 0'	9.24	9.63	10.06	10.53	11.05	11.63	12.26	12.97	13.77	14.67	15.70	16.89	12° 0'
30	8.86	9.22	9.61	10.04	10.51	11.03	11.60	12.23	12.94	13.73	14.63	15.66	30
13° 0'	8.50	8.84	9.20	9.59	10.02	10.49	11.00	11.57	12.20	12.91	13.69	14.59	13° 0'
30	8.18	8.48	8.82	9.18	9.57	10.00	10.46	10.97	11.54	12.17	12.87	13.65	30
14° 0'	7.88	8.16	8.47	8.80	9.16	9.56	9.97	10.44	10.94	11.51	12.13	12.83	14° 0'
30	7.59	7.86	8.14	8.45	8.78	9.13	9.52	9.95	10.41	10.91	11.47	12.10	30
15° 0'	7.33	7.57	7.84	8.12	8.43	8.76	9.11	9.50	9.92	10.38	10.88	11.44	15° 0'
30	7.08	7.31	7.56	7.82	8.10	8.41	8.73	9.09	9.47	9.89	10.34	10.85	30
16° 0'	6.85	7.06	7.29	7.53	7.80	8.07	8.38	8.71	9.06	9.44	9.85	10.31	16° 0'
30	6.63	6.83	7.04	7.27	7.51	7.77	8.05	8.36	8.68	9.03	9.41	9.82	30
17° 0'	6.42	6.61	6.81	7.02	7.25	7.49	7.75	8.03	8.33	8.65	9.00	9.38	17° 0'
30	6.23	6.40	6.59	6.79	7.00	7.23	7.47	7.72	8.00	8.30	8.62	8.97	30
18° 0'	6.04	6.21	6.39	6.57	6.77	6.98	7.21	7.45	7.70	7.98	8.27	8.59	18° 0'
30	5.87	6.02	6.19	6.37	6.55	6.75	6.96	7.19	7.42	7.67	7.95	8.24	30
19° 0'	5.70	5.85	6.01	6.17	6.35	6.53	6.73	6.94	7.16	7.39	7.64	7.92	19° 0'
30	5.54	5.68	5.83	5.99	6.15	6.33	6.51	6.71	6.91	7.13	7.36	7.61	30
20° 0'	5.39	5.53	5.67	5.81	5.97	6.13	6.30	6.49	6.68	6.89	7.10	7.34	20° 0'
30	5.25	5.38	5.51	5.65	5.79	5.95	6.11	6.28	6.46	6.66	6.86	7.07	30
21° 0'	5.12	5.24	5.36	5.49	5.63	5.77	5.92	6.09	6.25	6.44	6.63	6.83	21° 0'
30	4.99	5.10	5.22	5.34	5.47	5.61	5.75	5.90	6.06	6.23	6.41	6.60	30
22° 0'	4.86	4.97	5.08	5.20	5.32	5.45	5.58	5.73	5.88	6.04	6.20	6.38	22° 0'
30	4.74	4.84	4.95	5.06	5.18	5.30	5.43	5.56	5.71	5.86	6.01	6.18	30
23° 0'	4.63	4.72	4.82	4.93	5.04	5.16	5.28	5.41	5.54	5.69	5.83	5.99	23° 0'
30	4.52	4.61	4.70	4.80	4.91	5.02	5.14	5.26	5.39	5.52	5.66	5.80	30
24° 0'	4.41	4.50	4.59	4.68	4.79	4.89	5.00	5.12	5.23	5.36	5.49	5.63	24° 0'
30	4.31	4.39	4.48	4.57	4.67	4.77	4.87	4.98	5.09	5.21	5.33	5.47	30
25° 0'	4.21	4.29	4.37	4.46	4.55	4.64	4.74	4.85	4.95	5.07	5.18	5.31	25° 0'
30	4.12	4.19	4.27	4.35	4.44	4.53	4.62	4.72	4.82	4.93	5.04	5.16	30
26° 0'	4.03	4.10	4.18	4.25	4.34	4.42	4.51	4.60	4.70	4.80	4.91	5.02	26° 0'
30	3.94	4.01	4.08	4.16	4.24	4.32	4.40	4.49	4.58	4.68	4.78	4.89	30
27° 0'	3.85	3.92	3.99	4.06	4.14	4.22	4.30	4.38	4.47	4.56	4.65	4.76	27° 0'
30	3.77	3.83	3.90	3.97	4.04	4.12	4.20	4.28	4.36	4.45	4.53	4.63	30
28° 0'	3.69	3.76	3.82	3.88	3.95	4.02	4.10	4.18	4.25	4.34	4.42	4.51	28° 0'
30	3.61	3.67	3.74	3.80	3.86	3.93	4.00	4.08	4.15	4.23	4.31	4.40	30
29° 0'	3.54	3.60	3.66	3.72	3.78	3.84	3.91	3.98	4.05	4.13	4.21	4.29	29° 0'
30	3.47	3.53	3.58	3.64	3.70	3.76	3.82	3.89	3.96	4.03	4.11	4.19	30
30° 0'	3.40	3.45	3.51	3.56	3.62	3.68	3.74	3.80	3.87	3.94	4.01	4.09	30° 0'

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	0° 0'	0° 30'	1° 0'	1° 30'	2° 0'	2° 30'	3° 0'	3° 30'	4° 0'	4° 30'	5° 0'	5° 30'	
30° 0'	3.40	3.45	3.51	3.56	3.62	3.68	3.74	3.80	3.87	3.94	4.01	4.09	30° 0'
30 30	3.33	3.38	3.44	3.49	3.54	3.60	3.66	3.72	3.78	3.84	3.91	3.98	30 30
31° 0'	3.27	3.32	3.37	3.42	3.47	3.52	3.58	3.64	3.70	3.76	3.82	3.89	31° 0'
30 30	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.56	3.62	3.67	3.73	3.80	30 30
32° 0'	3.14	3.18	3.23	3.28	3.33	3.38	3.43	3.48	3.54	3.59	3.65	3.71	32° 0'
30 30	3.08	3.12	3.17	3.21	3.26	3.31	3.36	3.41	3.46	3.51	3.57	3.63	30 30
33° 0'	3.02	3.06	3.11	3.15	3.20	3.24	3.29	3.34	3.39	3.44	3.49	3.55	33° 0'
30 30	2.96	3.00	3.05	3.09	3.13	3.17	3.22	3.27	3.32	3.36	3.41	3.47	30 30
34° 0'	2.91	2.95	2.99	3.03	3.07	3.11	3.16	3.20	3.25	3.29	3.34	3.39	34° 0'
30 30	2.85	2.89	2.93	2.97	3.01	3.05	3.09	3.14	3.18	3.22	3.27	3.32	30 30
35° 0'	2.80	2.84	2.88	2.91	2.95	2.99	3.03	3.07	3.12	3.16	3.20	3.25	35° 0'
30 30	2.75	2.78	2.82	2.85	2.89	2.93	2.97	3.01	3.05	3.09	3.13	3.18	30 30
36° 0'	2.70	2.73	2.77	2.80	2.84	2.87	2.91	2.95	2.99	3.03	3.07	3.11	36° 0'
30 30	2.65	2.68	2.72	2.75	2.78	2.81	2.85	2.89	2.93	2.97	3.01	3.05	30 30
37° 0'	2.61	2.64	2.67	2.70	2.73	2.76	2.80	2.83	2.87	2.91	2.95	2.99	37° 0'
30 30	2.56	2.59	2.62	2.65	2.68	2.71	2.74	2.78	2.81	2.85	2.89	2.92	30 30
38° 0'	2.51	2.54	2.57	2.60	2.63	2.66	2.69	2.72	2.76	2.79	2.83	2.86	38° 0'
30 30	2.46	2.49	2.52	2.55	2.58	2.61	2.64	2.67	2.70	2.74	2.77	2.81	30 30
39° 0'	2.42	2.45	2.48	2.50	2.53	2.56	2.59	2.62	2.65	2.68	2.72	2.75	39° 0'
30 30	2.38	2.40	2.43	2.45	2.48	2.51	2.54	2.57	2.60	2.63	2.66	2.70	30 30
40° 0'	2.34	2.36	2.39	2.41	2.44	2.47	2.50	2.52	2.55	2.58	2.61	2.64	40° 0'
30 30	2.30	2.32	2.35	2.37	2.39	2.42	2.45	2.48	2.50	2.53	2.56	2.59	30 30
41° 0'	2.26	2.28	2.31	2.33	2.35	2.37	2.40	2.43	2.46	2.48	2.51	2.54	41° 0'
30 30	2.22	2.24	2.26	2.28	2.31	2.33	2.36	2.38	2.41	2.44	2.46	2.49	30 30
42° 0'	2.18	2.20	2.22	2.24	2.27	2.29	2.32	2.34	2.36	2.39	2.42	2.44	42° 0'
30 30	2.14	2.16	2.18	2.20	2.23	2.25	2.27	2.30	2.32	2.34	2.37	2.39	30 30
43° 0'	2.11	2.13	2.15	2.17	2.19	2.21	2.23	2.25	2.28	2.30	2.32	2.34	43° 0'
30 30	2.07	2.09	2.11	2.13	2.15	2.17	2.19	2.21	2.23	2.26	2.28	2.30	30 30
44° 0'	2.03	2.05	2.07	2.09	2.11	2.13	2.15	2.17	2.19	2.21	2.24	2.26	44° 0'
30 30	1.99	2.01	2.03	2.05	2.07	2.09	2.11	2.13	2.15	2.17	2.19	2.21	30 30
45° 0'	1.96	1.98	2.00	2.01	2.03	2.05	2.07	2.09	2.11	2.13	2.15	2.17	45° 0'
30 30	1.93	1.94	1.96	1.97	1.99	2.01	2.03	2.05	2.07	2.09	2.11	2.13	30 30
46° 0'	1.90	1.91	1.93	1.94	1.96	1.98	2.00	2.01	2.03	2.05	2.07	2.09	46° 0'
30 30	1.86	1.87	1.89	1.90	1.92	1.94	1.96	1.98	1.99	2.01	2.03	2.05	30 30
47° 0'	1.83	1.84	1.86	1.87	1.89	1.91	1.93	1.94	1.96	1.97	1.99	2.01	47° 0'
30 30	1.80	1.81	1.83	1.84	1.86	1.87	1.89	1.91	1.92	1.94	1.95	1.97	30 30
48° 0'	1.77	1.78	1.80	1.81	1.83	1.84	1.86	1.87	1.89	1.90	1.92	1.93	48° 0'
30 30	1.74	1.75	1.76	1.77	1.79	1.80	1.82	1.84	1.85	1.87	1.88	1.90	30 30
49° 0'	1.71	1.72	1.73	1.74	1.76	1.77	1.79	1.80	1.82	1.83	1.85	1.86	49° 0'
30 30	1.68	1.69	1.70	1.71	1.73	1.74	1.75	1.77	1.78	1.80	1.81	1.83	30 30
50° 0'	1.65	1.66	1.67	1.68	1.70	1.71	1.72	1.73	1.75	1.76	1.78	1.79	50° 0'
30 30	1.62	1.63	1.64	1.65	1.67	1.68	1.69	1.70	1.72	1.73	1.74	1.76	30 30
51° 0'	1.59	1.60	1.61	1.62	1.64	1.65	1.66	1.67	1.69	1.70	1.71	1.72	51° 0'
30 30	1.56	1.57	1.58	1.59	1.61	1.62	1.63	1.64	1.65	1.67	1.68	1.69	30 30
52° 0'	1.53	1.54	1.56	1.57	1.58	1.59	1.60	1.61	1.62	1.63	1.65	1.66	52° 0'
30 30	1.50	1.51	1.53	1.54	1.55	1.56	1.57	1.58	1.59	1.60	1.61	1.63	30 30
53° 0'	1.48	1.49	1.50	1.51	1.52	1.53	1.54	1.55	1.56	1.57	1.58	1.59	53° 0'
30 30	1.45	1.46	1.47	1.48	1.49	1.50	1.51	1.52	1.53	1.54	1.55	1.56	30 30
54° 0'	1.43	1.43	1.44	1.45	1.46	1.47	1.48	1.49	1.50	1.51	1.52	1.53	54° 0'
30 30	1.40	1.40	1.41	1.42	1.43	1.44	1.45	1.46	1.47	1.48	1.49	1.50	30 30
55° 0'	1.37	1.38	1.39	1.40	1.41	1.42	1.43	1.44	1.45	1.45	1.46	1.47	55° 0'
30 30	1.34	1.35	1.36	1.37	1.38	1.39	1.40	1.41	1.42	1.43	1.43	1.44	30 30
56° 0'	1.32	1.33	1.34	1.35	1.36	1.36	1.37	1.38	1.39	1.40	1.41	1.42	56° 0'
30 30	1.30	1.30	1.31	1.32	1.33	1.33	1.34	1.35	1.36	1.37	1.38	1.39	30 30
57° 0'	1.28	1.28	1.29	1.29	1.30	1.31	1.32	1.33	1.34	1.34	1.35	1.36	57° 0'
30 30	1.25	1.25	1.26	1.26	1.27	1.28	1.29	1.30	1.31	1.32	1.32	1.33	30 30
58° 0'	1.23	1.23	1.24	1.24	1.25	1.26	1.27	1.27	1.28	1.29	1.30	1.30	58° 0'
30 30	1.20	1.20	1.21	1.22	1.23	1.23	1.24	1.25	1.25	1.26	1.27	1.28	30 30
59° 0'	1.18	1.18	1.19	1.20	1.21	1.21	1.22	1.22	1.23	1.24	1.25	1.25	59° 0'
30 30	1.15	1.16	1.17	1.17	1.18	1.18	1.19	1.20	1.20	1.21	1.22	1.23	30 30
60° 0'	1.13	1.14	1.15	1.15	1.16	1.16	1.17	1.17	1.18	1.18	1.19	1.20	60° 0'

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	6° 0'	6° 30'	7° 0'	7° 30'	8° 0'	8° 30'	9° 0'	9° 30'	10° 0'	10° 30'	11° 0'	11° 30'	
0° 0'	18.68	17.23	15.99	14.92	13.97	13.14	12.40	11.73	11.14	10.60	10.10	9.65	0° 0'
0° 30'	20.37	18.66	17.21	15.97	14.90	13.95	13.12	12.38	11.72	11.12	10.58	10.08	0° 30'
1° 0'	22.40	20.35	18.64	17.19	15.95	14.88	13.93	13.10	12.36	11.70	11.10	10.56	1° 0'
1° 30'	24.88	22.37	20.32	18.61	17.16	15.92	14.85	13.91	13.07	12.33	11.67	11.07	1° 30'
2° 0'	27.98	24.85	22.35	20.30	18.59	17.14	15.90	14.83	13.89	13.05	12.31	11.65	2° 0'
2° 30'	31.96	27.94	24.82	22.32	20.27	18.56	17.11	15.87	14.80	13.86	13.03	12.29	2° 30'
3° 0'	37.26	31.91	27.90	24.78	22.28	20.23	18.53	17.08	15.84	14.77	13.83	13.00	3° 0'
3° 30'		37.21	31.86	27.86	24.74	22.24	20.21	18.49	17.05	15.81	14.74	13.80	3° 30'
4° 0'			37.15	31.81	27.81	24.69	22.20	20.16	18.45	17.01	15.78	14.71	4° 0'
4° 30'				37.08	31.75	27.76	24.64	22.15	20.12	18.41	16.97	15.74	4° 30'
5° 0'					37.01	31.69	27.70	24.59	22.10	20.07	18.37	16.93	5° 0'
5° 30'						36.93	31.62	27.64	24.53	22.05	20.02	18.32	5° 30'
6° 0'							36.85	31.55	27.57	24.47	21.99	19.96	6° 0'
6° 30'								36.76	31.47	27.50	24.41	21.93	6° 30'
7° 0'									36.67	31.39	27.42	24.34	7° 0'
7° 30'										36.57	31.30	27.34	7° 30'
8° 0'											36.47	31.21	8° 0'
8° 30'												36.36	8° 30'
9° 0'	36.85												9° 0'
9° 30'	31.55	36.76											9° 30'
10° 0'	27.57	31.47	36.67										10° 0'
10° 30'	24.47	27.50	31.39	36.57									10° 30'
11° 0'	21.99	24.41	27.42	31.30	36.47								11° 0'
11° 30'	19.96	21.93	24.34	27.34	31.21	36.36							11° 30'
12° 0'	18.27	19.91	21.87	24.27	27.26	31.11	36.25						12° 0'
12° 30'	16.84	18.22	19.85	21.81	24.19	27.18	31.01	36.13					12° 30'
13° 0'	15.61	16.79	18.17	19.79	21.74	24.11	27.09	30.91	36.00				13° 0'
13° 30'	14.55	15.57	16.74	18.11	19.73	21.67	24.03	27.00	30.80	35.87			13° 30'
14° 0'	13.61	14.51	15.52	16.69	18.05	19.66	21.59	23.95	26.90	30.69	35.73		14° 0'
14° 30'	12.79	13.57	14.46	15.47	16.63	17.99	19.59	21.51	23.86	26.79	30.57	35.59	14° 30'
15° 0'	12.06	12.75	13.53	14.41	15.41	16.57	17.92	19.52	21.43	23.77	26.69	30.45	15° 0'
15° 30'	11.40	12.02	12.71	13.48	14.35	15.36	16.51	17.85	19.44	21.35	23.67	26.58	15° 30'
16° 0'	10.81	11.36	11.98	12.66	13.43	14.30	15.30	16.45	17.78	19.36	21.26	23.57	16° 0'
16° 30'	10.27	10.77	11.32	11.94	12.61	13.38	14.25	15.24	16.38	17.71	19.28	21.17	16° 30'
17° 0'	9.79	10.24	10.73	11.28	11.89	12.56	13.33	14.19	15.17	16.31	17.63	19.20	17° 0'
17° 30'	9.34	9.75	10.20	10.69	11.24	11.84	12.51	13.27	14.13	15.11	16.24	17.55	17° 30'
18° 0'	8.93	9.31	9.71	10.16	10.65	11.19	11.79	12.46	13.21	14.07	15.04	16.17	18° 0'
18° 30'	8.56	8.90	9.27	9.68	10.12	10.61	11.14	11.74	12.41	13.15	14.00	14.97	18° 30'
19° 0'	8.21	8.53	8.86	9.23	9.64	10.08	10.56	11.09	11.69	12.35	13.09	13.94	19° 0'
19° 30'	7.89	8.18	8.49	8.83	9.19	9.60	10.03	10.51	11.04	11.64	12.29	13.03	19° 30'
20° 0'	7.58	7.86	8.14	8.46	8.79	9.15	9.55	9.99	10.46	10.99	11.58	12.23	20° 0'
20° 30'	7.31	7.55	7.82	8.11	8.42	8.75	9.11	9.51	9.94	10.41	10.94	11.52	20° 30'
21° 0'	7.04	7.28	7.52	7.79	8.07	8.38	8.71	9.07	9.46	9.89	10.36	10.89	21° 0'
21° 30'	6.80	7.01	7.24	7.49	7.75	8.03	8.34	8.67	9.02	9.42	9.84	10.31	21° 30'
22° 0'	6.57	6.77	6.98	7.21	7.45	7.72	7.99	8.30	8.62	8.98	9.37	9.79	22° 0'
22° 30'	6.35	6.54	6.74	6.95	7.17	7.42	7.68	7.95	8.25	8.58	8.93	9.32	22° 30'
23° 0'	6.15	6.32	6.51	6.71	6.92	7.14	7.38	7.64	7.91	8.21	8.53	8.88	23° 0'
23° 30'	5.96	6.12	6.29	6.48	6.67	6.89	7.10	7.34	7.60	7.87	8.17	8.49	23° 30'
24° 0'	5.77	5.93	6.09	6.26	6.44	6.64	6.85	7.07	7.30	7.56	7.83	8.12	24° 0'
24° 30'	5.60	5.75	5.90	6.06	6.23	6.41	6.60	6.81	7.03	7.26	7.51	7.79	24° 30'
25° 0'	5.44	5.57	5.72	5.87	6.03	6.20	6.38	6.57	6.77	6.99	7.22	7.47	25° 0'
25° 30'	5.28	5.41	5.54	5.69	5.84	6.00	6.16	6.35	6.53	6.73	6.95	7.18	25° 30'
26° 0'	5.13	5.26	5.38	5.51	5.66	5.81	5.96	6.13	6.31	6.49	6.69	6.91	26° 0'
26° 30'	4.99	5.11	5.23	5.35	5.48	5.63	5.77	5.93	6.09	6.27	6.45	6.65	26° 30'
27° 0'	4.86	4.97	5.08	5.20	5.32	5.45	5.59	5.74	5.89	6.06	6.23	6.41	27° 0'
27° 30'	4.73	4.83	4.94	5.05	5.17	5.29	5.42	5.56	5.70	5.86	6.02	6.19	27° 30'
28° 0'	4.60	4.70	4.80	4.91	5.02	5.14	5.26	5.39	5.53	5.67	5.82	5.98	28° 0'
28° 30'	4.48	4.58	4.67	4.78	4.88	4.99	5.11	5.23	5.36	5.50	5.63	5.79	28° 30'
29° 0'	4.37	4.46	4.55	4.65	4.75	4.85	4.96	5.08	5.19	5.33	5.46	5.60	29° 0'
29° 30'	4.26	4.35	4.43	4.53	4.62	4.72	4.82	4.93	5.04	5.16	5.29	5.42	29° 30'
30° 0'	4.16	4.24	4.32	4.41	4.50	4.59	4.69	4.79	4.90	5.01	5.13	5.26	30° 0'

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	6̂ 0̂	6̂ 30̂	7̂ 0̂	7̂ 30̂	8̂ 0̂	8̂ 30̂	9̂ 0̂	9̂ 30̂	10̂ 0̂	10̂ 30̂	11̂ 0̂	11̂ 30̂	
30	4.16	4.24	4.32	4.41	4.50	4.59	4.69	4.79	4.90	5.01	5.13	5.25	30
30	4.06	4.13	4.21	4.29	4.38	4.47	4.56	4.66	4.76	4.87	4.98	5.10	30
31	3.96	4.03	4.11	4.19	4.27	4.35	4.44	4.53	4.63	4.73	4.83	4.94	31
30	3.87	3.94	4.01	4.08	4.16	4.24	4.32	4.41	4.50	4.59	4.69	4.80	30
32	3.78	3.84	3.91	3.98	4.05	4.13	4.21	4.29	4.38	4.47	4.56	4.66	32
30	3.69	3.75	3.82	3.86	3.95	4.02	4.10	4.18	4.26	4.35	4.44	4.53	30
33	3.61	3.67	3.73	3.79	3.86	3.93	4.00	4.07	4.15	4.23	4.32	4.40	33
30	3.53	3.58	3.64	3.70	3.76	3.83	3.90	3.97	4.04	4.12	4.20	4.28	30
34	3.45	3.50	3.56	3.62	3.68	3.74	3.80	3.87	3.94	4.01	4.09	4.17	34
30	3.37	3.42	3.48	3.54	3.59	3.65	3.71	3.77	3.84	3.91	3.98	4.06	30
35	3.30	3.35	3.40	3.45	3.51	3.56	3.62	3.68	3.75	3.81	3.88	3.95	35
30	3.23	3.27	3.32	3.37	3.43	3.48	3.54	3.60	3.66	3.72	3.78	3.85	30
36	3.16	3.20	3.25	3.30	3.35	3.40	3.46	3.51	3.57	3.63	3.69	3.75	36
30	3.09	3.13	3.18	3.23	3.27	3.32	3.38	3.43	3.48	3.54	3.60	3.66	30
37	3.03	3.07	3.11	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.51	3.57	37
30	2.96	3.00	3.04	3.08	3.13	3.17	3.22	3.27	3.32	3.37	3.43	3.48	30
38	2.90	2.94	2.98	3.02	3.06	3.10	3.15	3.20	3.25	3.30	3.35	3.40	38
30	2.84	2.88	2.92	2.95	2.99	3.03	3.08	3.12	3.17	3.22	3.27	3.32	30
39	2.79	2.82	2.86	2.89	2.93	2.97	3.01	3.05	3.10	3.14	3.19	3.24	39
30	2.73	2.76	2.80	2.83	2.87	2.90	2.94	2.98	3.03	3.07	3.12	3.16	30
40	2.68	2.71	2.74	2.77	2.81	2.84	2.88	2.92	2.96	3.00	3.05	3.09	40
30	2.62	2.65	2.68	2.71	2.75	2.78	2.82	2.85	2.89	2.93	2.98	3.02	30
41	2.57	2.60	2.63	2.66	2.69	2.72	2.76	2.80	2.83	2.87	2.91	2.95	41
30	2.52	2.55	2.58	2.60	2.63	2.67	2.70	2.73	2.77	2.80	2.84	2.88	30
42	2.47	2.50	2.53	2.55	2.58	2.61	2.65	2.67	2.71	2.74	2.78	2.81	42
30	2.42	2.44	2.47	2.50	2.53	2.56	2.59	2.63	2.65	2.68	2.72	2.75	30
43	2.37	2.39	2.42	2.45	2.48	2.51	2.54	2.57	2.60	2.63	2.66	2.69	43
30	2.32	2.35	2.37	2.40	2.43	2.45	2.48	2.51	2.54	2.57	2.60	2.63	30
44	2.28	2.30	2.33	2.35	2.38	2.40	2.43	2.46	2.49	2.51	2.55	2.58	44
30	2.23	2.26	2.28	2.30	2.33	2.35	2.38	2.40	2.43	2.46	2.49	2.52	30
45	2.19	2.21	2.24	2.26	2.28	2.30	2.33	2.35	2.38	2.41	2.44	2.46	45
30	2.15	2.17	2.19	2.21	2.23	2.26	2.28	2.31	2.33	2.35	2.38	2.41	30
46	2.11	2.13	2.15	2.17	2.19	2.21	2.24	2.26	2.29	2.31	2.33	2.36	46
30	2.07	2.09	2.11	2.13	2.15	2.17	2.19	2.21	2.24	2.26	2.29	2.31	30
47	2.03	2.05	2.07	2.09	2.11	2.13	2.15	2.17	2.19	2.21	2.24	2.26	47
30	1.99	2.01	2.03	2.04	2.06	2.08	2.10	2.12	2.14	2.16	2.19	2.21	30
48	1.95	1.97	1.99	2.00	2.02	2.04	2.06	2.08	2.10	2.12	2.14	2.17	48
30	1.91	1.93	1.95	1.96	1.98	2.00	2.02	2.04	2.06	2.07	2.09	2.12	30
49	1.88	1.89	1.91	1.92	1.94	1.96	1.98	2.00	2.02	2.03	2.05	2.07	49
30	1.84	1.86	1.87	1.88	1.90	1.92	1.94	1.96	1.97	1.99	2.01	2.03	30
50	1.81	1.82	1.84	1.85	1.87	1.88	1.90	1.91	1.93	1.95	1.97	1.99	50
30	1.77	1.79	1.80	1.81	1.83	1.84	1.86	1.87	1.89	1.91	1.93	1.94	30
51	1.74	1.75	1.77	1.78	1.79	1.80	1.82	1.83	1.85	1.87	1.89	1.90	51
30	1.70	1.72	1.73	1.74	1.75	1.77	1.78	1.80	1.81	1.83	1.85	1.86	30
52	1.67	1.68	1.70	1.71	1.72	1.73	1.75	1.76	1.78	1.79	1.81	1.82	52
30	1.64	1.65	1.66	1.67	1.68	1.70	1.71	1.73	1.74	1.75	1.77	1.78	30
53	1.61	1.62	1.63	1.64	1.65	1.66	1.68	1.69	1.71	1.72	1.73	1.74	53
30	1.57	1.59	1.60	1.61	1.62	1.63	1.64	1.66	1.67	1.68	1.69	1.70	30
54	1.54	1.55	1.57	1.58	1.59	1.60	1.61	1.62	1.64	1.65	1.66	1.67	54
30	1.51	1.52	1.53	1.54	1.55	1.57	1.58	1.59	1.60	1.61	1.62	1.64	30
55	1.48	1.49	1.50	1.51	1.52	1.53	1.55	1.56	1.57	1.58	1.59	1.60	55
30	1.45	1.46	1.47	1.48	1.49	1.50	1.51	1.52	1.53	1.54	1.55	1.57	30
56	1.43	1.43	1.44	1.45	1.46	1.47	1.48	1.49	1.50	1.51	1.52	1.53	56
30	1.40	1.41	1.41	1.42	1.43	1.44	1.45	1.46	1.47	1.48	1.49	1.50	30
57	1.37	1.38	1.39	1.39	1.40	1.41	1.42	1.43	1.44	1.45	1.46	1.47	57
30	1.34	1.35	1.36	1.37	1.37	1.38	1.39	1.40	1.41	1.42	1.43	1.44	30
58	1.31	1.32	1.33	1.34	1.35	1.35	1.36	1.37	1.38	1.39	1.40	1.40	58
30	1.28	1.29	1.30	1.31	1.32	1.32	1.33	1.34	1.35	1.36	1.37	1.37	30
59	1.26	1.26	1.27	1.28	1.29	1.29	1.30	1.31	1.32	1.33	1.34	1.34	59
30	1.23	1.24	1.24	1.25	1.26	1.27	1.27	1.28	1.29	1.30	1.31	1.31	30
60	1.21	1.21	1.22	1.22	1.23	1.24	1.25	1.25	1.26	1.27	1.28	1.28	60

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	12 0	12 30	13 0	13 30	14 0	14 30	15 0	15 30	16 0	16 30	17 0	17 30	
0 0	9.24	8.86	8.50	8.18	7.88	7.59	7.33	7.08	6.85	6.63	6.42	6.23	0 0
30	9.63	9.22	8.84	8.48	8.16	7.86	7.57	7.31	7.06	6.83	6.61	6.40	30
1 0	10.06	9.61	9.20	8.82	8.47	8.14	7.84	7.56	7.29	7.04	6.81	6.59	1 0
30	10.53	10.04	9.59	9.18	8.80	8.45	8.12	7.82	7.53	7.27	7.02	6.79	30
2 0	11.05	10.51	10.02	9.57	9.16	8.78	8.43	8.10	7.80	7.51	7.25	7.00	2 0
30	11.63	11.03	10.49	10.00	9.56	9.13	8.76	8.41	8.07	7.77	7.49	7.23	30
3 0	12.26	11.60	11.00	10.46	9.97	9.52	9.11	8.73	8.38	8.05	7.75	7.47	3 0
30	12.97	12.23	11.57	10.97	10.44	9.95	9.50	9.09	8.71	8.36	8.03	7.72	30
4 0	13.77	12.94	12.20	11.54	10.94	10.41	9.92	9.47	9.06	8.68	8.33	8.00	4 0
30	14.67	13.73	12.91	12.17	11.51	10.91	10.38	9.89	9.44	9.03	8.65	8.30	30
5 0	15.70	14.63	13.69	12.87	12.13	11.47	10.88	10.34	9.85	9.41	9.00	8.62	5 0
30	16.89	15.66	14.59	13.65	12.83	12.10	11.44	10.85	10.31	9.82	9.38	8.97	30
6 0	18.27	16.84	15.61	14.55	13.61	12.79	12.06	11.40	10.81	10.27	9.79	9.34	6 0
30	19.91	18.22	16.79	15.57	14.51	13.57	12.75	12.02	11.36	10.77	10.24	9.75	30
7 0	21.87	19.85	18.17	16.74	15.52	14.46	13.53	12.71	11.98	11.32	10.73	10.20	7 0
30	24.27	21.81	19.79	18.11	16.69	15.47	14.41	13.48	12.66	11.94	11.28	10.69	30
8 0	27.26	24.19	21.74	19.73	18.05	16.63	15.41	14.35	13.43	12.61	11.89	11.24	8 0
30	31.11	27.18	24.11	21.67	19.66	17.99	16.57	15.36	14.30	13.38	12.56	11.84	30
9 0	36.25	31.01	27.09	24.03	21.59	19.59	17.92	16.51	15.30	14.25	13.33	12.51	9 0
30		36.13	30.91	27.00	23.95	21.51	19.52	17.85	16.45	15.24	14.19	13.27	30
10 0			36.00	30.80	26.90	23.86	21.43	19.44	17.78	16.38	15.17	14.13	10 0
30				35.87	30.69	26.79	23.77	21.35	19.36	17.71	16.31	15.11	30
11 0					35.73	30.57	26.69	23.67	21.26	19.28	17.63	16.24	11 0
30						35.59	30.45	26.58	23.57	21.17	19.20	17.55	30
12 0							35.45	30.32	26.47	23.47	21.07	19.11	12 0
30								35.30	30.19	26.35	23.37	20.98	30
13 0									35.14	30.05	26.23	23.26	13 0
30										34.98	29.91	26.11	30
14 0											34.81	29.76	14 0
30												34.64	30
15 0	35.45												15 0
30	30.32	35.30											30
16 0	26.47	30.19	35.14										16 0
30	23.47	26.35	30.05	34.98									30
17 0	21.07	23.37	26.23	29.91	34.81								17 0
30	19.11	20.98	23.26	26.11	29.76	34.64							30
18 0	17.47	19.02	20.88	23.15	25.98	29.61	34.47						18 0
30	16.09	17.39	18.93	20.78	23.03	25.84	29.46	34.28					30
19 0	14.90	16.01	17.31	18.84	20.67	22.91	25.71	29.30					19 0
30	13.87	14.83	15.93	17.22	18.74	20.56	22.79	25.57	29.14	33.90			30
20 0	12.97	13.80	14.75	15.85	17.13	18.64	20.45	22.66	25.43	28.97	33.71		20 0
30	12.17	12.90	13.73	14.67	15.76	17.04	18.53	20.34	22.53	25.28	28.81	33.51	30
21 0	11.46	12.11	12.83	13.66	14.59	15.68	16.94	18.43	20.22	22.40	25.13	28.63	21 0
30	10.83	11.40	12.04	12.76	13.58	14.51	15.59	16.84	18.32	20.10	22.27	25.97	30
22 0	10.25	10.77	11.34	11.98	12.69	13.50	14.43	15.50	16.74	18.21	19.98	22.13	22 0
30	9.74	10.20	10.71	11.28	11.91	12.62	13.42	14.35	15.40	16.64	18.10	19.85	30
23 0	9.27	9.69	10.14	10.65	11.21	11.84	12.54	13.34	14.26	15.30	16.54	17.98	23 0
30	8.83	9.22	9.63	10.08	10.59	11.15	11.77	12.47	13.26	14.17	15.21	16.43	30
24 0	8.44	8.78	9.16	9.57	10.02	10.53	11.08	11.70	12.39	13.17	14.08	15.11	24 0
30	8.07	8.39	8.73	9.11	9.51	9.96	10.46	11.01	11.62	12.31	13.09	13.98	30
25 0	7.74	8.03	8.34	8.68	9.05	9.45	9.90	10.39	10.93	11.54	12.23	13.00	25 0
30	7.43	7.65	7.98	8.29	8.62	8.99	9.39	9.84	10.32	10.86	11.47	12.15	30
26 0	7.14	7.38	7.64	7.93	8.24	8.57	8.93	9.33	9.77	10.25	10.79	11.39	26 0
30	6.86	7.10	7.33	7.60	7.88	8.19	8.51	8.87	9.27	9.70	10.18	10.72	30
27 0	6.61	6.82	7.05	7.29	7.55	7.83	8.13	8.46	8.81	9.20	9.63	10.11	27 0
30	6.37	6.57	6.78	7.00	7.24	7.50	7.77	8.08	8.40	8.75	9.14	9.57	30
28 0	6.15	6.33	6.53	6.74	6.95	7.19	7.44	7.72	8.02	8.34	8.69	9.08	28 0
30	5.94	6.11	6.29	6.49	6.69	6.91	7.14	7.39	7.66	7.96	8.28	8.63	30
29 0	5.75	5.90	6.07	6.25	6.44	6.64	6.86	7.09	7.34	7.60	7.90	8.22	29 0
30	5.56	5.71	5.86	6.03	6.21	6.40	6.59	6.81	7.04	7.28	7.55	7.84	30
30 0	5.38	5.53	5.67	5.83	5.99	6.17	6.35	6.54	6.76	6.98	7.23	7.49	30 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.														Latitude.
	12 0	12 30	13 0	13 30	14 0	14 30	15 0	15 30	16 0	16 30	17 0	17 30			
30 0	5.38	5.52	5.67	5.83	5.99	6.17	6.35	6.54	6.76	6.98	7.23	7.49	30 0		
30 30	5.22	5.35	5.49	5.61	5.78	5.95	6.12	6.30	6.49	6.71	6.93	7.18	30 30		
31 0	5.06	5.18	5.31	5.44	5.56	5.73	5.90	6.07	6.25	6.44	6.65	6.87	31 0		
30 30	4.91	5.02	5.14	5.27	5.40	5.53	5.69	5.85	6.02	6.20	6.39	6.60	30 30		
32 0	4.76	4.87	4.98	5.10	5.23	5.36	5.50	5.64	5.81	5.98	6.15	6.34	32 0		
30 30	4.62	4.72	4.82	4.94	5.06	5.19	5.32	5.46	5.60	5.76	5.93	6.10	30 30		
33 0	4.49	4.59	4.69	4.79	4.91	5.02	5.15	5.28	5.41	5.56	5.71	5.88	33 0		
30 30	4.37	4.46	4.56	4.66	4.76	4.87	4.98	5.10	5.23	5.37	5.51	5.66	30 30		
34 0	4.25	4.34	4.43	4.52	4.62	4.72	4.83	4.94	5.06	5.19	5.32	5.46	34 0		
30 30	4.14	4.22	4.30	4.39	4.48	4.58	4.68	4.79	4.90	5.02	5.15	5.27	30 30		
35 0	4.03	4.11	4.18	4.26	4.35	4.44	4.54	4.64	4.75	4.86	4.98	5.10	35 0		
30 30	3.92	3.99	4.07	4.15	4.23	4.32	4.41	4.50	4.60	4.71	4.82	4.94	30 30		
36 0	3.82	3.89	3.96	4.03	4.11	4.19	4.28	4.37	4.46	4.56	4.67	4.78	36 0		
30 30	3.72	3.79	3.86	3.93	4.00	4.08	4.16	4.24	4.33	4.42	4.52	4.62	30 30		
37 0	3.63	3.69	3.76	3.82	3.89	3.96	4.04	4.12	4.21	4.29	4.38	4.48	37 0		
30 30	3.54	3.60	3.66	3.72	3.79	3.86	3.93	4.01	4.09	4.17	4.25	4.34	30 30		
38 0	3.45	3.51	3.57	3.62	3.69	3.75	3.82	3.89	3.97	4.05	4.13	4.21	38 0		
30 30	3.37	3.42	3.48	3.53	3.59	3.65	3.72	3.79	3.86	3.99	4.02	4.09	30 30		
39 0	3.29	3.34	3.39	3.44	3.50	3.56	3.62	3.68	3.75	3.82	3.90	3.97	39 0		
30 30	3.21	3.26	3.31	3.36	3.41	3.47	3.53	3.59	3.65	3.72	3.79	3.86	30 30		
40 0	3.13	3.18	3.23	3.28	3.33	3.38	3.44	3.49	3.55	3.61	3.68	3.75	40 0		
30 30	3.06	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.46	3.52	3.58	3.64	30 30		
41 0	2.99	3.03	3.08	3.12	3.17	3.22	3.27	3.32	3.37	3.42	3.48	3.54	41 0		
30 30	2.92	2.96	3.00	3.05	3.09	3.13	3.18	3.23	3.28	3.33	3.39	3.44	30 30		
42 0	2.85	2.89	2.93	2.97	3.02	3.06	3.10	3.15	3.20	3.25	3.30	3.35	42 0		
30 30	2.79	2.82	2.86	2.90	2.94	2.98	3.02	3.07	3.12	3.16	3.21	3.26	30 30		
43 0	2.73	2.76	2.80	2.83	2.87	2.91	2.95	2.99	3.04	3.08	3.13	3.18	43 0		
30 30	2.67	2.70	2.73	2.77	2.80	2.84	2.88	2.92	2.96	3.01	3.05	3.09	30 30		
44 0	2.61	2.64	2.67	2.70	2.74	2.77	2.81	2.85	2.89	2.93	2.98	3.02	44 0		
30 30	2.55	2.58	2.61	2.64	2.68	2.71	2.74	2.78	2.82	2.86	2.90	2.94	30 30		
45 0	2.49	2.52	2.55	2.58	2.62	2.65	2.68	2.71	2.75	2.79	2.83	2.86	45 0		
30 30	2.44	2.46	2.49	2.52	2.56	2.59	2.62	2.65	2.68	2.72	2.76	2.79	30 30		
46 0	2.39	2.41	2.44	2.47	2.50	2.53	2.56	2.59	2.62	2.65	2.69	2.72	46 0		
30 30	2.33	2.36	2.38	2.41	2.45	2.47	2.50	2.53	2.56	2.59	2.62	2.66	30 30		
47 0	2.28	2.30	2.33	2.36	2.39	2.41	2.44	2.47	2.50	2.53	2.56	2.59	47 0		
30 30	2.23	2.25	2.28	2.30	2.33	2.36	2.38	2.41	2.44	2.47	2.50	2.53	30 30		
48 0	2.19	2.21	2.23	2.25	2.28	2.30	2.33	2.35	2.38	2.41	2.44	2.47	48 0		
30 30	2.14	2.16	2.18	2.20	2.23	2.25	2.28	2.30	2.32	2.35	2.38	2.41	30 30		
49 0	2.09	2.11	2.13	2.15	2.18	2.20	2.23	2.25	2.27	2.29	2.32	2.35	49 0		
30 30	2.05	2.06	2.08	2.10	2.13	2.15	2.18	2.20	2.22	2.24	2.27	2.29	30 30		
50 0	2.01	2.02	2.04	2.06	2.08	2.10	2.13	2.15	2.17	2.19	2.22	2.24	50 0		
30 30	1.96	1.98	2.00	2.01	2.03	2.05	2.08	2.10	2.12	2.14	2.16	2.19	30 30		
51 0	1.92	1.94	1.96	1.97	1.99	2.01	2.03	2.05	2.07	2.09	2.11	2.13	51 0		
30 30	1.88	1.89	1.91	1.93	1.95	1.96	1.98	2.00	2.02	2.04	2.06	2.08	30 30		
52 0	1.84	1.85	1.87	1.89	1.91	1.92	1.94	1.96	1.98	2.00	2.02	2.03	52 0		
30 30	1.80	1.81	1.83	1.84	1.86	1.88	1.89	1.91	1.93	1.95	1.97	1.99	30 30		
53 0	1.76	1.77	1.79	1.80	1.82	1.83	1.85	1.87	1.89	1.90	1.92	1.94	53 0		
30 30	1.72	1.73	1.75	1.76	1.78	1.79	1.81	1.82	1.84	1.86	1.87	1.89	30 30		
54 0	1.69	1.70	1.71	1.72	1.74	1.75	1.77	1.78	1.80	1.81	1.83	1.85	54 0		
30 30	1.65	1.66	1.67	1.69	1.70	1.71	1.73	1.74	1.76	1.77	1.79	1.80	30 30		
55 0	1.62	1.63	1.64	1.65	1.67	1.68	1.69	1.70	1.72	1.73	1.75	1.76	55 0		
30 30	1.58	1.59	1.60	1.61	1.63	1.64	1.65	1.66	1.68	1.69	1.71	1.72	30 30		
56 0	1.55	1.56	1.57	1.58	1.59	1.60	1.62	1.63	1.64	1.65	1.67	1.68	56 0		
30 30	1.51	1.52	1.53	1.54	1.55	1.56	1.58	1.59	1.60	1.61	1.63	1.64	30 30		
57 0	1.48	1.49	1.50	1.51	1.52	1.53	1.54	1.55	1.57	1.58	1.59	1.60	57 0		
30 30	1.44	1.45	1.46	1.47	1.48	1.49	1.50	1.51	1.53	1.54	1.55	1.56	30 30		
58 0	1.41	1.42	1.43	1.44	1.45	1.46	1.47	1.48	1.49	1.50	1.52	1.53	58 0		
30 30	1.38	1.39	1.40	1.41	1.42	1.43	1.44	1.45	1.46	1.47	1.48	1.49	30 30		
59 0	1.35	1.36	1.37	1.38	1.39	1.40	1.41	1.42	1.43	1.44	1.45	1.46	59 0		
30 30	1.32	1.33	1.34	1.34	1.35	1.36	1.37	1.38	1.39	1.40	1.41	1.42	30 30		
60 0	1.29	1.30	1.31	1.31	1.32	1.33	1.34	1.35	1.36	1.37	1.38	1.39	60 0		

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	18 0	18 30	19 0	19 30	20 0	20 30	21 0	21 30	22 0	22 30	23 0	23 30	
0 0	6.04	5.87	5.70	5.54	5.39	5.25	5.12	4.99	4.86	4.74	4.63	4.52	0 0
30	6.21	6.02	5.85	5.68	5.53	5.38	5.24	5.10	4.97	4.84	4.72	4.61	30
1 0	6.39	6.19	6.01	5.83	5.67	5.51	5.36	5.22	5.08	4.95	4.82	4.70	1 0
30	6.57	6.37	6.17	5.99	5.81	5.65	5.49	5.34	5.20	5.06	4.93	4.80	30
2 0	6.77	6.55	6.35	6.15	5.97	5.79	5.63	5.47	5.32	5.18	5.04	4.91	2 0
30	6.98	6.75	6.53	6.33	6.13	5.95	5.77	5.61	5.45	5.30	5.16	5.02	30
3 0	7.21	6.96	6.73	6.51	6.30	6.11	5.92	5.75	5.58	5.43	5.28	5.14	3 0
30	7.45	7.19	6.94	6.71	6.49	6.28	6.09	5.90	5.73	5.56	5.41	5.26	30
4 0	7.70	7.42	7.16	6.91	6.68	6.46	6.25	6.06	5.88	5.71	5.54	5.39	4 0
30	7.98	7.67	7.39	7.13	6.89	6.66	6.44	6.23	6.04	5.86	5.69	5.52	30
5 0	8.27	7.95	7.64	7.30	7.10	6.86	6.63	6.41	6.20	6.01	5.83	5.66	5 0
30	8.59	8.24	7.92	7.61	7.34	7.07	6.83	6.60	6.38	6.18	5.99	5.80	30
6 0	8.93	8.56	8.21	7.89	7.58	7.31	7.04	6.80	6.57	6.35	6.15	5.96	6 0
30	9.31	8.90	8.53	8.18	7.86	7.55	7.28	7.01	6.77	6.54	6.32	6.12	30
7 0	9.71	9.27	8.86	8.49	8.14	7.82	7.52	7.24	6.98	6.74	6.51	6.29	7 0
30	10.16	9.68	9.23	8.83	8.46	8.11	7.79	7.49	7.21	6.95	6.71	6.48	30
8 0	10.65	10.12	9.64	9.19	8.79	8.42	8.07	7.75	7.45	7.17	6.92	6.67	8 0
30	11.19	10.61	10.08	9.60	9.15	8.75	8.38	8.03	7.72	7.42	7.14	6.89	30
9 0	11.79	11.14	10.56	10.03	9.55	9.11	8.71	8.34	7.99	7.68	7.38	7.10	9 0
30	12.46	11.74	11.09	10.51	9.99	9.51	9.07	8.67	8.30	7.95	7.64	7.34	30
10 0	13.21	12.41	11.69	11.04	10.46	9.94	9.46	9.02	8.62	8.25	7.91	7.60	10 0
30	14.07	13.15	12.35	11.64	10.99	10.41	9.89	9.42	8.98	8.58	8.21	7.87	30
11 0	15.04	14.00	13.09	12.29	11.58	10.94	10.36	9.84	9.37	8.93	8.53	8.17	11 0
30	16.17	14.97	13.94	13.03	12.23	11.52	10.89	10.31	9.79	9.32	8.88	8.49	30
12 0	17.47	16.09	14.90	13.87	12.97	12.17	11.46	10.83	10.25	9.74	9.27	8.83	12 0
30	19.02	17.32	16.01	14.83	13.80	12.90	12.11	11.40	10.77	10.20	9.69	9.22	30
13 0	20.88	18.93	17.31	15.93	14.75	13.73	12.83	12.04	11.34	10.71	10.14	9.63	13 0
30	23.15	20.78	18.84	17.22	15.85	14.67	13.66	12.76	11.98	11.28	10.65	10.08	30
14 0	25.98	23.03	20.67	18.74	17.13	15.76	14.59	13.58	12.69	11.91	11.21	10.59	14 0
30	29.61	25.84	22.91	20.56	18.64	17.04	15.68	14.51	13.50	12.62	11.84	11.15	14 0
15 0	34.47	29.46	25.71	22.79	20.45	18.53	16.94	15.59	14.43	13.42	12.54	11.77	15 0
30		34.28	29.30	25.57	22.66	20.34	18.43	16.84	15.50	14.35	13.34	12.47	30
16 0			34.10	29.14	25.43	22.53	20.22	18.32	16.74	15.40	14.26	13.26	16 0
30				33.90	25.28	22.40	20.10	18.21	16.64	15.30	14.17	13.17	30
17 0					33.71	25.13	20.00	18.11	16.54	15.21	14.04	13.04	17 0
30						33.51	20.00	18.03	16.47	15.14	13.97	12.97	30
18 0							33.31	20.00	18.00	16.44	15.11	13.94	18 0
30								33.10	20.00	16.41	15.08	13.91	30
19 0									32.89	20.00	16.38	13.88	19 0
30										32.67	20.00	16.35	30
20 0											32.45	20.00	20 0
30												32.23	30
21 0	33.31												21 0
30	28.46	33.10											30
22 0	24.82	28.28	32.89										22 0
30	21.99	24.66	28.10	32.67									30
23 0	19.72	21.85	24.50	27.91	32.45								23 0
30	17.87	19.59	21.70	24.33	27.72	32.23							30
24 0	16.32	17.75	19.46	21.55	24.16	27.52	32.00						24 0
30	15.01	16.21	17.63	19.32	21.40	23.99	27.32	31.76					30
25 0	13.89	14.91	16.10	17.50	19.19	21.25	23.82	27.12	31.52				25 0
30	12.91	13.79	14.80	15.98	17.38	19.05	21.09	23.64	26.92	31.27			30
26 0	12.06	12.82	13.69	14.69	15.87	17.25	18.90	20.93	23.46	26.71	31.03		26 0
30	11.31	11.98	12.73	13.59	14.59	15.75	17.12	18.76	20.77	23.27	26.50	30.78	30
27 0	10.64	11.23	11.89	12.63	13.49	14.48	15.63	16.99	18.61	20.60	23.09	26.28	27 0
30	10.04	10.56	11.14	11.80	12.54	13.39	14.36	15.51	16.85	18.46	20.43	22.90	30
28 0	9.50	9.97	10.48	11.06	11.71	12.44	13.28	14.25	15.38	16.71	18.31	20.26	28 0
30	9.01	9.43	9.89	10.40	10.97	11.62	12.34	13.18	14.13	15.25	16.57	18.15	30
29 0	8.56	8.94	9.35	9.81	10.32	10.88	11.52	12.24	13.07	14.01	15.12	16.43	29 0
30	8.15	8.50	8.87	9.28	9.73	10.24	10.79	11.42	12.14	12.95	13.90	14.99	30
30 0	7.78	8.09	8.43	8.80	9.20	9.65	10.15	10.70	11.33	12.03	12.84	13.77	30 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	18 0	18 30	19 0	19 30	20 0	20 30	21 0	21 30	22 0	22 30	23 0	23 30	
30 0	7.78	8.09	8.43	8.80	9.20	9.65	10.15	10.70	11.33	12.03	12.84	13.77	30 0
30 30	7.43	7.71	8.02	8.36	8.72	9.12	9.57	10.06	10.61	11.23	11.93	12.73	30 30
31 0	7.12	7.37	7.65	7.95	8.29	8.65	9.05	9.49	9.98	10.52	11.13	11.82	31 0
31 30	6.82	7.06	7.31	7.59	7.89	8.22	8.58	8.97	9.41	9.89	10.43	11.03	31 30
32 0	6.55	6.76	7.00	7.25	7.53	7.82	8.15	8.50	8.89	9.32	9.80	10.33	32 0
32 30	6.29	6.50	6.71	6.94	7.19	7.46	7.76	8.07	8.43	8.81	9.24	9.71	32 30
33 0	6.05	6.23	6.44	6.65	6.88	7.12	7.39	7.68	8.00	8.35	8.73	9.15	33 0
33 30	5.83	6.00	6.18	6.38	6.59	6.82	7.06	7.32	7.61	7.92	8.27	8.64	33 30
34 0	5.61	5.78	5.95	6.12	6.32	6.53	6.76	6.99	7.26	7.54	7.85	8.19	34 0
34 30	5.42	5.56	5.73	5.89	6.07	6.27	6.47	6.69	6.93	7.19	7.47	7.77	34 30
35 0	5.23	5.37	5.52	5.68	5.84	6.02	6.21	6.41	6.63	6.86	7.12	7.39	35 0
35 30	5.06	5.19	5.32	5.47	5.62	5.79	5.96	6.15	6.35	6.56	6.80	7.05	35 30
36 0	4.89	5.01	5.14	5.27	5.42	5.56	5.73	5.91	6.09	6.28	6.50	6.73	36 0
36 30	4.73	4.84	4.96	5.09	5.22	5.36	5.51	5.68	5.85	6.03	6.22	6.43	36 30
37 0	4.58	4.69	4.80	4.92	5.04	5.17	5.31	5.46	5.62	5.79	5.97	6.16	37 0
37 30	4.44	4.54	4.64	4.75	4.87	4.99	5.12	5.25	5.41	5.56	5.73	5.90	37 30
38 0	4.30	4.39	4.49	4.59	4.70	4.82	4.94	5.07	5.20	5.35	5.50	5.67	38 0
38 30	4.17	4.26	4.35	4.45	4.55	4.66	4.77	4.89	5.02	5.15	5.29	5.44	38 30
39 0	4.05	4.13	4.22	4.31	4.40	4.50	4.61	4.72	4.84	4.96	5.10	5.23	39 0
39 30	3.93	4.01	4.09	4.17	4.26	4.36	4.46	4.56	4.67	4.79	4.91	5.04	39 30
40 0	3.82	3.89	3.97	4.05	4.13	4.22	4.31	4.41	4.51	4.62	4.74	4.85	40 0
40 30	3.71	3.78	3.85	3.93	4.01	4.09	4.17	4.26	4.36	4.46	4.57	4.68	40 30
41 0	3.61	3.67	3.74	3.81	3.89	3.96	4.04	4.13	4.22	4.31	4.41	4.52	41 0
41 30	3.51	3.57	3.63	3.70	3.77	3.84	3.92	4.00	4.09	4.17	4.27	4.36	41 30
42 0	3.41	3.47	3.53	3.59	3.66	3.73	3.80	3.88	3.96	4.04	4.13	4.22	42 0
42 30	3.32	3.37	3.43	3.49	3.55	3.62	3.69	3.76	3.84	3.91	3.99	4.08	42 30
43 0	3.23	3.28	3.34	3.39	3.45	3.51	3.58	3.65	3.72	3.79	3.86	3.94	43 0
43 30	3.14	3.19	3.25	3.30	3.35	3.41	3.47	3.54	3.61	3.67	3.74	3.81	43 30
44 0	3.06	3.10	3.16	3.21	3.26	3.31	3.37	3.43	3.50	3.56	3.63	3.69	44 0
44 30	2.98	3.02	3.07	3.12	3.17	3.22	3.28	3.33	3.39	3.45	3.52	3.58	44 30
45 0	2.91	2.95	2.99	3.04	3.09	3.14	3.19	3.24	3.29	3.35	3.41	3.47	45 0
45 30	2.83	2.87	2.91	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.31	3.37	45 30
46 0	2.76	2.80	2.84	2.88	2.92	2.96	3.01	3.06	3.11	3.16	3.21	3.27	46 0
46 30	2.69	2.73	2.76	2.80	2.84	2.88	2.93	2.97	3.02	3.07	3.12	3.17	46 30
47 0	2.63	2.66	2.69	2.73	2.77	2.81	2.85	2.89	2.94	2.98	3.03	3.08	47 0
47 30	2.56	2.59	2.62	2.66	2.70	2.73	2.77	2.81	2.86	2.90	2.94	2.99	47 30
48 0	2.50	2.53	2.56	2.59	2.63	2.66	2.70	2.74	2.78	2.82	2.86	2.90	48 0
48 30	2.44	2.47	2.50	2.53	2.56	2.59	2.63	2.66	2.70	2.74	2.78	2.82	48 30
49 0	2.38	2.41	2.44	2.47	2.50	2.53	2.56	2.59	2.63	2.66	2.70	2.74	49 0
49 30	2.32	2.35	2.38	2.40	2.42	2.46	2.49	2.52	2.56	2.59	2.63	2.66	49 30
50 0	2.27	2.29	2.32	2.34	2.37	2.40	2.43	2.46	2.49	2.52	2.56	2.59	50 0
50 30	2.21	2.23	2.26	2.28	2.31	2.34	2.37	2.39	2.42	2.45	2.49	2.52	50 30
51 0	2.16	2.18	2.20	2.22	2.25	2.28	2.31	2.33	2.36	2.39	2.42	2.45	51 0
51 30	2.11	2.13	2.15	2.17	2.19	2.22	2.25	2.27	2.30	2.33	2.36	2.39	51 30
52 0	2.06	2.08	2.10	2.12	2.14	2.16	2.19	2.21	2.24	2.27	2.30	2.32	52 0
52 30	2.01	2.03	2.05	2.07	2.09	2.11	2.13	2.16	2.18	2.21	2.24	2.26	52 30
53 0	1.96	1.98	2.00	2.02	2.04	2.06	2.08	2.10	2.13	2.15	2.18	2.20	53 0
53 30	1.91	1.93	1.95	1.97	1.99	2.01	2.03	2.05	2.07	2.09	2.12	2.14	53 30
54 0	1.87	1.88	1.90	1.92	1.94	1.96	1.98	2.00	2.02	2.04	2.06	2.08	54 0
54 30	1.82	1.84	1.85	1.87	1.89	1.91	1.93	1.95	1.97	1.99	2.01	2.03	54 30
55 0	1.78	1.79	1.81	1.83	1.85	1.86	1.88	1.90	1.92	1.94	1.96	1.98	55 0
55 30	1.74	1.75	1.77	1.78	1.80	1.82	1.83	1.85	1.87	1.89	1.91	1.92	55 30
56 0	1.70	1.71	1.73	1.74	1.76	1.77	1.79	1.80	1.82	1.84	1.86	1.87	56 0
56 30	1.66	1.67	1.68	1.70	1.71	1.73	1.74	1.76	1.77	1.79	1.81	1.82	56 30
57 0	1.62	1.63	1.64	1.65	1.67	1.68	1.70	1.71	1.73	1.74	1.76	1.77	57 0
57 30	1.58	1.59	1.60	1.62	1.63	1.64	1.65	1.67	1.68	1.70	1.71	1.73	57 30
58 0	1.54	1.55	1.56	1.58	1.59	1.60	1.61	1.62	1.64	1.65	1.67	1.68	58 0
58 30	1.50	1.51	1.52	1.54	1.55	1.56	1.57	1.58	1.60	1.61	1.62	1.64	58 30
59 0	1.47	1.48	1.49	1.50	1.51	1.52	1.53	1.54	1.56	1.57	1.58	1.59	59 0
59 30	1.43	1.44	1.45	1.46	1.47	1.48	1.49	1.50	1.52	1.53	1.54	1.55	59 30
60 0	1.40	1.41	1.42	1.43	1.44	1.45	1.46	1.47	1.48	1.49	1.50	1.51	60 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	24 0	24 30	25 0	25 30	26 0	26 30	27 0	27 30	28 0	28 30	29 0	29 30	
0 0	4.41	4.31	4.21	4.12	4.03	3.94	3.85	3.77	3.69	3.61	3.54	3.47	0 0
30	4.50	4.39	4.29	4.19	4.10	4.01	3.92	3.83	3.76	3.67	3.60	3.53	30
1 0	4.59	4.48	4.37	4.27	4.18	4.08	3.99	3.90	3.82	3.74	3.66	3.58	1 0
30	4.68	4.57	4.46	4.35	4.25	4.16	4.06	3.97	3.88	3.80	3.72	3.64	30
2 0	4.79	4.67	4.55	4.44	4.34	4.24	4.14	4.04	3.95	3.86	3.78	3.70	2 0
30	4.89	4.77	4.64	4.53	4.42	4.32	4.22	4.12	4.02	3.93	3.84	3.76	30
3 0	5.00	4.87	4.74	4.62	4.51	4.40	4.30	4.20	4.10	4.00	3.91	3.82	3 0
30	5.12	4.98	4.85	4.72	4.60	4.49	4.38	4.28	4.18	4.08	3.98	3.89	30
4 0	5.23	5.09	4.95	4.82	4.70	4.58	4.47	4.36	4.25	4.15	4.05	3.96	4 0
30	5.36	5.21	5.07	4.93	4.80	4.68	4.56	4.45	4.34	4.23	4.13	4.03	30
5 0	5.49	5.33	5.18	5.04	4.91	4.78	4.65	4.53	4.42	4.31	4.21	4.11	5 0
30	5.63	5.47	5.31	5.16	5.02	4.89	4.76	4.63	4.51	4.40	4.29	4.19	30
6 0	5.77	5.60	5.44	5.28	5.13	4.99	4.86	4.73	4.60	4.48	4.37	4.26	6 0
30	5.93	5.75	5.57	5.41	5.26	5.11	4.97	4.83	4.70	4.58	4.46	4.35	30
7 0	6.09	5.90	5.72	5.54	5.38	5.23	5.08	4.94	4.80	4.67	4.55	4.43	7 0
30	6.26	6.06	5.87	5.69	5.51	5.35	5.20	5.05	4.91	4.78	4.65	4.53	30
8 0	6.44	6.23	6.03	5.84	5.66	5.48	5.32	5.17	5.02	4.88	4.75	4.62	8 0
30	6.64	6.41	6.20	6.00	5.81	5.63	5.45	5.29	5.14	4.99	4.85	4.72	30
9 0	6.85	6.60	6.38	6.16	5.96	5.77	5.59	5.42	5.26	5.11	4.96	4.82	9 0
30	7.07	6.81	6.57	6.35	6.13	5.93	5.74	5.56	5.39	5.23	5.08	4.93	30
10 0	7.30	7.03	6.77	6.53	6.31	6.09	5.89	5.70	5.53	5.36	5.19	5.04	10 0
30	7.56	7.26	6.99	6.73	6.49	6.27	6.06	5.86	5.67	5.50	5.33	5.16	30
11 0	7.83	7.51	7.22	6.95	6.69	6.45	6.23	6.02	5.82	5.63	5.46	5.29	11 0
30	8.12	7.79	7.47	7.18	6.91	6.65	6.41	6.19	5.98	5.79	5.60	5.42	30
12 0	8.44	8.07	7.74	7.43	7.14	6.86	6.61	6.37	6.15	5.94	5.75	5.56	12 0
30	8.78	8.39	8.03	7.69	7.38	7.10	6.82	6.57	6.33	6.11	5.90	5.71	30
13 0	9.16	8.73	8.34	7.98	7.64	7.33	7.05	6.78	6.53	6.29	6.07	5.86	13 0
30	9.57	9.11	8.68	8.29	7.93	7.60	7.29	7.00	6.74	6.49	6.25	6.03	30
14 0	10.02	9.51	9.05	8.62	8.24	7.88	7.55	7.24	6.95	6.69	6.44	6.21	14 0
30	10.53	9.96	9.45	8.99	8.57	8.19	7.83	7.50	7.19	6.91	6.64	6.40	30
15 0	11.08	10.46	9.90	9.39	8.93	8.51	8.13	7.77	7.44	7.14	6.86	6.59	15 0
30	11.70	11.01	10.39	9.84	9.33	8.87	8.46	8.08	7.72	7.39	7.09	6.81	30
16 0	12.39	11.62	10.93	10.32	9.77	9.27	8.81	8.40	8.02	7.66	7.34	7.04	16 0
30	13.17	12.31	11.54	10.86	10.25	9.70	9.20	8.75	8.34	7.96	7.60	7.28	30
17 0	14.08	13.09	12.23	11.47	10.79	10.18	9.63	9.14	8.69	8.28	7.90	7.55	17 0
30	15.11	13.98	13.00	12.15	11.39	10.72	10.11	9.57	9.08	8.63	8.22	7.84	30
18 0	16.32	15.01	13.89	12.91	12.06	11.31	10.64	10.04	9.50	9.01	8.56	8.15	18 0
30	17.75	16.21	14.91	13.79	12.82	11.98	11.23	10.56	9.97	9.43	8.94	8.50	30
19 0	19.46	17.63	16.10	14.80	13.69	12.73	11.89	11.14	10.48	9.89	9.35	8.87	19 0
30	21.55	19.32	17.50	15.98	14.69	13.59	12.63	11.80	11.06	10.40	9.81	9.28	30
20 0	24.16	21.40	19.19	17.38	15.87	14.59	13.49	12.54	11.71	10.97	10.32	9.73	20 0
30	27.52	23.99	21.25	19.05	17.25	15.75	14.48	13.39	12.44	11.62	10.88	10.24	30
21 0	32.00	27.32	23.82	21.09	18.90	17.12	15.63	14.36	13.28	12.34	11.52	10.79	21 0
30		31.76	27.12	23.64	20.93	18.76	16.99	15.51	14.25	13.18	12.24	11.42	30
22 0			31.52	26.92	23.46	20.77	18.61	16.85	15.38	14.13	13.07	12.14	22 0
30				31.27	26.71	23.27	20.60	18.46	16.71	15.25	14.01	12.95	30
23 0					31.03	26.50	23.09	20.43	18.31	16.57	15.12	13.90	23 0
30						30.78	26.28	22.90	20.26	18.15	16.43	14.99	30
24 0							30.54	26.06	22.70	20.09	18.00	16.29	24 0
30								30.28	25.84	22.50	19.91	17.84	30
25 0									30.02	25.62	22.31	19.74	25 0
30										29.75	25.39	22.11	30
26 0											29.49	25.16	26 0
30												29.22	30
27 0	30.54												27 0
30	26.06	30.28											30
28 0	22.70	25.84	30.02										28 0
30	20.09	22.50	25.62	29.75									30
29 0	18.00	19.91	22.31	25.39	29.49								29 0
30	16.29	17.84	19.74	22.11	25.16	29.22							30
30 0	14.86	16.14	17.68	19.56	21.91	25.37	28.95						30 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.			
	24 0	24 30	25 0	25 30	26 0	26 30	27 0	27 30	28 0	28 30	29 0	29 30				
30 0	14.86	16.14	17.68	19.56	21.91	24.92	28.95	"	"	"	"	"	30 0			
30 30	13.65	14.72	16.00	17.52	19.38	21.70	24.69	28.67	Altitude		above	87°	30 30			
31 0	12.62	13.52	14.59	15.85	17.36	19.19	21.50	24.45	28.39				31 0			
31 30	11.72	12.50	13.40	14.45	15.70	17.19	19.01	21.29	24.21	28.11				31 30		
32 0	10.93	11.61	12.38	13.27	14.32	15.54	17.02	18.82	21.08	23.97	27.83				32 0	
32 30	10.23	10.82	11.50	12.26	13.15	14.18	15.39	16.85	18.64	20.85	23.73	27.54				32 30
33 0	9.62	10.13	10.72	11.38	12.14	13.02	14.04	15.23	16.68	18.44	20.63	23.48				33 0
33 30	9.06	9.52	10.04	10.61	11.27	12.02	12.89	13.89	15.08	16.51	18.25	20.42				33 30
34 0	8.56	8.97	9.43	9.94	10.51	11.16	11.90	12.75	13.75	14.92	16.34	18.05				34 0
34 30	8.11	8.47	8.89	9.33	9.84	10.40	11.05	11.77	12.62	13.60	14.77	16.16				34 30
35 0	7.70	8.03	8.39	8.79	9.24	9.74	10.30	10.93	11.65	12.48	13.45	14.60				35 0
35 30	7.32	7.62	7.95	8.30	8.70	9.14	9.64	10.19	10.81	11.52	12.35	13.30				35 30
36 0	6.98	7.24	7.54	7.86	8.22	8.61	9.05	9.53	10.08	10.70	11.40	12.21				36 0
36 30	6.66	6.91	7.17	7.46	7.78	8.13	8.52	8.95	9.43	9.97	10.58	11.27				36 30
37 0	6.37	6.59	6.84	7.09	7.39	7.70	8.05	8.42	8.85	9.32	9.85	10.46				37 0
37 30	6.10	6.30	6.52	6.76	7.02	7.31	7.62	7.96	8.33	8.75	9.22	9.74				37 30
38 0	5.84	6.03	6.23	6.45	6.69	6.94	7.23	7.53	7.87	8.23	8.65	9.11				38 0
38 30	5.61	5.78	5.97	6.16	6.38	6.61	6.87	7.14	7.44	7.78	8.14	8.55				38 30
39 0	5.39	5.54	5.72	5.90	6.10	6.31	6.54	6.79	7.06	7.35	7.69	8.04				39 0
39 30	5.18	5.33	5.48	5.65	5.83	6.03	6.24	6.46	6.71	6.98	7.27	7.59				39 30
40 0	4.99	5.12	5.27	5.42	5.59	5.76	5.96	6.16	6.39	6.63	6.90	7.18				40 0
40 30	4.80	4.93	5.06	5.21	5.36	5.52	5.70	5.89	6.09	6.31	6.55	6.81				40 30
41 0	4.63	4.74	4.87	5.00	5.15	5.29	5.46	5.63	5.82	6.01	6.23	6.47				41 0
41 30	4.47	4.57	4.69	4.81	4.95	5.08	5.23	5.39	5.56	5.74	5.94	6.15				41 30
42 0	4.31	4.41	4.52	4.63	4.76	4.89	5.02	5.16	5.33	5.49	5.67	5.86				42 0
42 30	4.17	4.26	4.36	4.46	4.58	4.70	4.83	4.96	5.10	5.26	5.42	5.60				42 30
43 0	4.03	4.12	4.21	4.31	4.41	4.52	4.64	4.77	4.90	5.03	5.19	5.35				43 0
43 30	3.90	3.98	4.07	4.16	4.26	4.35	4.47	4.58	4.71	4.83	4.97	5.12				43 30
44 0	3.77	3.85	3.93	4.02	4.11	4.20	4.30	4.41	4.52	4.64	4.77	4.90				44 0
44 30	3.65	3.72	3.81	3.88	3.97	4.05	4.15	4.25	4.35	4.46	4.58	4.71				44 30
45 0	3.54	3.60	3.68	3.75	3.83	3.91	4.00	4.09	4.20	4.29	4.41	4.52				45 0
45 30	3.43	3.49	3.56	3.63	3.70	3.78	3.86	3.95	4.04	4.14	4.24	4.35				45 30
46 0	3.33	3.39	3.45	3.51	3.58	3.65	3.73	3.81	3.90	3.98	4.08	4.18				46 0
46 30	3.23	3.29	3.35	3.40	3.47	3.53	3.61	3.68	3.76	3.84	3.93	4.02				46 30
47 0	3.13	3.19	3.25	3.30	3.36	3.42	3.49	3.56	3.63	3.71	3.79	3.87				47 0
47 30	3.04	3.09	3.15	3.20	3.25	3.31	3.38	3.44	3.51	3.58	3.66	3.73				47 30
48 0	2.95	3.00	3.05	3.10	3.15	3.20	3.27	3.33	3.39	3.46	3.53	3.60				48 0
48 30	2.86	2.91	2.96	3.01	3.06	3.10	3.16	3.22	3.28	3.34	3.41	3.48				48 30
49 0	2.78	2.83	2.88	2.92	2.97	3.01	3.06	3.11	3.17	3.23	3.29	3.36				49 0
49 30	2.70	2.74	2.79	2.83	2.88	2.92	2.97	3.01	3.07	3.12	3.19	3.24				49 30
50 0	2.63	2.67	2.71	2.75	2.79	2.83	2.88	2.92	2.97	3.03	3.08	3.14				50 0
50 30	2.56	2.59	2.63	2.67	2.71	2.75	2.79	2.83	2.88	2.93	2.99	3.03				50 30
51 0	2.49	2.52	2.56	2.59	2.63	2.67	2.71	2.74	2.79	2.84	2.89	2.94				51 0
51 30	2.42	2.45	2.48	2.52	2.55	2.59	2.63	2.66	2.70	2.75	2.80	2.84				51 30
52 0	2.35	2.38	2.41	2.44	2.48	2.51	2.55	2.58	2.62	2.66	2.71	2.75				52 0
52 30	2.29	2.31	2.34	2.37	2.41	2.44	2.47	2.51	2.54	2.58	2.62	2.66				52 30
53 0	2.23	2.25	2.27	2.30	2.34	2.37	2.40	2.43	2.47	2.52	2.54	2.58				53 0
53 30	2.17	2.19	2.21	2.24	2.27	2.30	2.33	2.36	2.39	2.43	2.46	2.50				53 30
54 0	2.11	2.13	2.16	2.18	2.21	2.24	2.27	2.29	2.32	2.35	2.39	2.42				54 0
54 30	2.05	2.07	2.09	2.12	2.15	2.17	2.20	2.23	2.25	2.28	2.32	2.35				54 30
55 0	2.00	2.01	2.03	2.06	2.09	2.11	2.14	2.16	2.19	2.22	2.25	2.28				55 0
55 30	1.94	1.96	1.98	1.99	2.03	2.05	2.08	2.10	2.12	2.15	2.18	2.21				55 30
56 0	1.89	1.91	1.93	1.95	1.97	1.99	2.02	2.04	2.06	2.08	2.11	2.14				56 0
56 30	1.84	1.85	1.87	1.90	1.92	1.94	1.96	1.98	2.00	2.02	2.05	2.07				56 30
57 0	1.79	1.80	1.82	1.84	1.87	1.89	1.91	1.93	1.95	1.97	1.99	2.01				57 0
57 30	1.74	1.76	1.77	1.79	1.81	1.83	1.85	1.87	1.89	1.91	1.93	1.95				57 30
58 0	1.70	1.71	1.73	1.74	1.76	1.78	1.80	1.82	1.84	1.86	1.88	1.90				58 0
58 30	1.65	1.66	1.68	1.70	1.71	1.73	1.75	1.76	1.78	1.80	1.82	1.84				58 30
59 0	1.61	1.62	1.63	1.65	1.67	1.68	1.70	1.71	1.73	1.75	1.77	1.79				59 0
59 30	1.57	1.58	1.59	1.60	1.62	1.64	1.65	1.67	1.68	1.70	1.72	1.73				59 30
60 0	1.53	1.54	1.55	1.56	1.58	1.59	1.61	1.62	1.64	1.65	1.67	1.68				60 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	30 0	30 30	31 0	31 30	32 0	32 30	33 0	33 30	34 0	34 30	35 0	35 30	
0 0	3.40	3.33	3.27	3.20	3.14	3.08	3.02	2.96	2.91	2.85	2.80	2.75	0 0
0 30	3.45	3.38	3.32	3.25	3.18	3.12	3.06	3.00	2.95	2.89	2.84	2.78	0 30
1 0	3.51	3.44	3.37	3.30	3.23	3.17	3.11	3.05	2.99	2.93	2.88	2.82	1 0
1 30	3.56	3.49	3.42	3.35	3.28	3.21	3.15	3.09	3.03	2.97	2.91	2.85	1 30
2 0	3.62	3.54	3.47	3.40	3.33	3.26	3.20	3.13	3.07	3.01	2.95	2.89	2 0
2 30	3.68	3.60	3.52	3.45	3.38	3.31	3.24	3.17	3.11	3.05	2.99	2.93	2 30
3 0	3.74	3.66	3.58	3.50	3.43	3.36	3.29	3.22	3.16	3.09	3.03	2.97	3 0
3 30	3.80	3.72	3.64	3.56	3.48	3.41	3.34	3.27	3.20	3.14	3.07	3.01	3 30
4 0	3.87	3.78	3.70	3.62	3.54	3.46	3.39	3.32	3.25	3.18	3.12	3.05	4 0
4 30	3.94	3.84	3.76	3.67	3.59	3.51	3.44	3.36	3.29	3.22	3.16	3.09	4 30
5 0	4.01	3.91	3.82	3.73	3.65	3.57	3.49	3.41	3.34	3.27	3.20	3.13	5 0
5 30	4.09	3.98	3.89	3.80	3.71	3.63	3.55	3.47	3.39	3.32	3.25	3.18	5 30
6 0	4.16	4.06	3.96	3.87	3.78	3.69	3.61	3.53	3.45	3.37	3.30	3.23	6 0
6 30	4.24	4.13	4.03	3.94	3.84	3.75	3.67	3.58	3.50	3.42	3.35	3.27	6 30
7 0	4.32	4.21	4.11	4.01	3.91	3.82	3.73	3.64	3.56	3.48	3.40	3.32	7 0
7 30	4.41	4.29	4.19	4.08	3.98	3.86	3.79	3.70	3.62	3.54	3.45	3.37	7 30
8 0	4.50	4.38	4.27	4.16	4.05	3.95	3.86	3.76	3.68	3.59	3.51	3.43	8 0
8 30	4.59	4.47	4.35	4.24	4.13	4.02	3.93	3.83	3.74	3.65	3.56	3.48	8 30
9 0	4.69	4.56	4.44	4.32	4.21	4.10	4.00	3.90	3.80	3.71	3.62	3.54	9 0
9 30	4.79	4.66	4.53	4.41	4.29	4.18	4.07	3.97	3.87	3.77	3.68	3.60	9 30
10 0	4.90	4.76	4.63	4.50	4.38	4.26	4.15	4.04	3.94	3.84	3.75	3.66	10 0
10 30	5.01	4.87	4.73	4.59	4.47	4.35	4.23	4.12	4.01	3.91	3.81	3.72	10 30
11 0	5.13	4.98	4.83	4.69	4.56	4.44	4.32	4.20	4.09	3.98	3.88	3.78	11 0
11 30	5.26	5.10	4.94	4.80	4.66	4.53	4.40	4.28	4.17	4.06	3.95	3.85	11 30
12 0	5.38	5.22	5.06	4.91	4.76	4.62	4.49	4.37	4.25	4.14	4.03	3.92	12 0
12 30	5.53	5.35	5.18	5.02	4.87	4.72	4.59	4.46	4.34	4.22	4.11	3.99	12 30
13 0	5.67	5.49	5.31	5.14	4.98	4.82	4.69	4.56	4.43	4.30	4.18	4.07	13 0
13 30	5.83	5.61	5.44	5.27	5.10	4.94	4.79	4.66	4.52	4.39	4.26	4.15	13 30
14 0	5.99	5.78	5.56	5.40	5.23	5.06	4.91	4.76	4.62	4.48	4.35	4.23	14 0
14 30	6.17	5.95	5.73	5.53	5.36	5.19	5.02	4.87	4.72	4.58	4.44	4.32	14 30
15 0	6.35	6.12	5.90	5.69	5.50	5.32	5.15	4.98	4.83	4.68	4.54	4.41	15 0
15 30	6.54	6.30	6.07	5.85	5.64	5.46	5.28	5.10	4.94	4.79	4.64	4.50	15 30
16 0	6.76	6.49	6.25	6.02	5.81	5.60	5.41	5.23	5.06	4.90	4.75	4.60	16 0
16 30	6.98	6.71	6.44	6.20	5.98	5.76	5.56	5.37	5.19	5.02	4.86	4.71	16 30
17 0	7.23	6.93	6.65	6.39	6.15	5.93	5.71	5.51	5.32	5.15	4.98	4.82	17 0
17 30	7.49	7.18	6.87	6.60	6.34	6.10	5.88	5.66	5.46	5.27	5.10	4.94	17 30
18 0	7.78	7.43	7.12	6.82	6.55	6.29	6.05	5.83	5.61	5.42	5.23	5.06	18 0
18 30	8.09	7.71	7.37	7.06	6.76	6.50	6.23	6.00	5.78	5.56	5.37	5.19	18 30
19 0	8.43	8.02	7.65	7.31	7.00	6.71	6.44	6.18	5.95	5.73	5.52	5.32	19 0
19 30	8.80	8.36	7.95	7.59	7.25	6.94	6.65	6.38	6.12	5.89	5.68	5.47	19 30
20 0	9.20	8.72	8.29	7.89	7.53	7.19	6.88	6.59	6.32	6.07	5.84	5.62	20 0
20 30	9.65	9.12	8.65	8.22	7.82	7.40	7.12	6.82	6.53	6.27	6.02	5.79	20 30
21 0	10.15	9.57	9.05	8.58	8.15	7.76	7.39	7.06	6.76	6.47	6.21	5.96	21 0
21 30	10.70	10.06	9.49	8.97	8.50	8.07	7.68	7.32	6.99	6.69	6.41	6.15	21 30
22 0	11.33	10.61	9.98	9.41	8.89	8.43	8.00	7.61	7.26	6.93	6.63	6.35	22 0
22 30	12.03	11.23	10.52	9.89	9.32	8.81	8.35	7.92	7.54	7.19	6.86	6.56	22 30
23 0	12.84	11.93	11.13	10.43	9.80	9.24	8.73	8.27	7.85	7.47	7.12	6.80	23 0
23 30	13.77	12.73	11.82	11.03	10.33	9.71	9.15	8.64	8.19	7.77	7.39	7.05	23 30
24 0	14.86	13.65	12.62	11.72	10.93	10.23	9.62	9.06	8.56	8.11	7.70	7.32	24 0
24 30	16.14	14.72	13.52	12.50	11.61	10.82	10.13	9.52	8.97	8.47	8.03	7.62	24 30
25 0	17.68	16.00	14.59	13.40	12.38	11.50	10.72	10.04	9.43	8.89	8.39	7.95	25 0
25 30	19.56	17.52	15.85	14.45	13.27	12.26	11.38	10.61	9.94	9.33	8.79	8.30	25 30
26 0	21.91	19.38	17.36	15.70	14.32	13.15	12.14	11.27	10.51	9.84	9.24	8.70	26 0
26 30	24.92	21.70	19.19	17.19	15.54	14.18	13.02	12.02	11.16	10.40	9.74	9.14	26 30
27 0	28.95	24.69	21.50	19.01	17.02	15.39	14.04	12.89	11.90	11.05	10.30	9.64	27 0
27 30		28.67	24.45	21.29	18.82	16.85	15.23	13.89	12.75	11.77	10.93	10.19	27 30
28 0			28.39	24.21	21.08	18.64	16.68	15.08	13.75	12.62	11.65	10.81	28 0
28 30				28.11	23.97	20.85	18.44	16.51	14.92	13.60	12.48	11.52	28 30
29 0		Altitude	above	87°	27.83	23.73	20.63	18.25	16.34	14.77	13.45	12.35	29 0
29 30						27.54	23.48	20.42	18.05	16.16	14.60	13.30	29 30
30 0							27.25	23.23	20.21	17.86	15.98	14.44	30 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	30 0	30 30	31 0	31 30	32 0	32 30	33 0	33 30	34 0	34 30	35 0	35 30	
30 0	"	"	"	"	"	"	27.25	23.23	20.21	17.86	15.98	14.44	30 0
30 30								26.96	22.97	19.98	17.66	15.80	30 30
31 0									26.66	22.72	19.76	17.46	31 0
31 30										22.46	19.53	17.46	31 30
32 0											26.06	22.21	32 0
32 30							Altitude	above	87°			25.76	32 30
33 0	27.25	26.96											33 0
33 30	23.23	26.96											33 30
34 0	20.21	22.97	26.66										34 0
34 30	17.86	19.98	22.72	26.36									34 30
35 0	15.98	17.66	19.76	22.46	26.06								35 0
35 30	14.44	15.80	17.46	19.53	22.21	25.76							35 30
36 0	13.16	14.28	15.62	17.26	19.31	21.94	25.46						36 0
36 30	12.07	13.01	14.12	15.44	17.06	19.08	21.68	25.15					36 30
37 0	11.14	11.93	12.86	13.95	15.26	16.85	18.85	21.41	24.84				37 0
37 30	10.34	11.01	11.80	12.75	13.78	15.07	16.65	18.62	21.15	24.53			37 30
38 0	9.63	10.21	10.88	11.65	12.55	13.61	14.89	16.44	18.39	20.88	24.22		38 0
38 30	9.00	9.52	10.09	10.75	11.51	12.39	13.45	14.70	16.23	18.15	20.62	23.90	38 30
39 0	8.45	8.89	9.40	9.96	10.62	11.36	12.24	13.27	14.51	16.02	17.92	20.34	39 0
39 30	7.95	8.34	8.79	9.28	9.84	10.48	11.22	12.08	13.10	14.32	15.82	17.68	39 30
40 0	7.50	7.85	8.24	8.68	9.16	9.71	10.35	11.07	11.93	12.93	14.14	15.60	40 0
40 30	7.10	7.40	7.75	8.13	8.57	9.04	9.59	10.21	10.93	11.77	12.76	13.94	40 30
41 0	6.73	7.01	7.31	7.65	8.03	8.45	8.93	9.46	10.08	10.78	11.61	12.58	41 0
41 30	6.39	6.64	6.92	7.22	7.56	7.92	8.34	8.81	9.33	9.94	10.64	11.45	41 30
42 0	6.08	6.30	6.56	6.83	7.13	7.46	7.82	8.22	8.69	9.20	9.81	10.49	42 0
42 30	5.79	6.00	6.22	6.47	6.74	7.03	7.36	7.71	8.11	8.57	9.08	9.67	42 30
43 0	5.53	5.71	5.92	6.14	6.38	6.65	6.94	7.25	7.61	8.00	8.45	8.95	43 0
43 30	5.28	5.45	5.64	5.84	6.06	6.29	6.56	6.84	7.15	7.50	7.89	8.33	43 30
44 0	5.06	5.21	5.38	5.56	5.76	5.97	6.21	6.46	6.74	7.05	7.40	7.77	44 0
44 30	4.84	4.99	5.14	5.30	5.49	5.68	5.89	6.12	6.37	6.64	6.95	7.29	44 30
45 0	4.65	4.77	4.92	5.07	5.23	5.41	5.60	5.80	6.03	6.28	6.55	6.84	45 0
45 30	4.46	4.58	4.71	4.85	5.00	5.15	5.33	5.52	5.72	5.94	6.19	6.45	45 30
46 0	4.29	4.40	4.52	4.64	4.78	4.93	5.08	5.25	5.44	5.63	5.86	6.09	46 0
46 30	4.12	4.22	4.34	4.45	4.58	4.71	4.86	5.00	5.17	5.36	5.55	5.77	46 30
47 0	3.97	4.06	4.16	4.27	4.39	4.51	4.64	4.78	4.93	5.09	5.28	5.46	47 0
47 30	3.82	3.91	4.00	4.10	4.21	4.32	4.44	4.57	4.71	4.85	5.02	5.19	47 30
48 0	3.68	3.76	3.85	3.94	4.04	4.14	4.26	4.37	4.50	4.63	4.78	4.94	48 0
48 30	3.55	3.62	3.71	3.79	3.88	3.98	4.08	4.19	4.30	4.43	4.56	4.70	48 30
49 0	3.43	3.49	3.57	3.65	3.74	3.82	3.92	4.01	4.12	4.23	4.36	4.48	49 0
49 30	3.31	3.37	3.44	3.51	3.60	3.68	3.77	3.86	3.95	4.05	4.17	4.29	49 30
50 0	3.20	3.26	3.32	3.38	3.46	3.54	3.62	3.70	3.80	3.89	3.99	4.10	50 0
50 30	3.09	3.15	3.21	3.27	3.33	3.40	3.49	3.56	3.64	3.73	3.83	3.92	50 30
51 0	2.99	3.04	3.10	3.16	3.22	3.28	3.35	3.43	3.50	3.58	3.67	3.76	51 0
51 30	2.89	2.94	2.99	3.05	3.11	3.16	3.23	3.29	3.37	3.44	3.52	3.61	51 30
52 0	2.79	2.84	2.89	2.94	3.00	3.05	3.11	3.17	3.24	3.31	3.39	3.46	52 0
52 30	2.70	2.74	2.79	2.84	2.90	2.95	3.00	3.05	3.12	3.18	3.26	3.33	52 30
53 0	2.62	2.65	2.70	2.74	2.80	2.85	2.90	2.95	3.00	3.06	3.13	3.20	53 0
53 30	2.54	2.57	2.61	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.01	3.07	53 30
54 0	2.46	2.49	2.53	2.56	2.61	2.65	2.70	2.75	2.80	2.85	2.90	2.95	54 0
54 30	2.38	2.41	2.45	2.48	2.52	2.56	2.61	2.65	2.70	2.75	2.80	2.84	54 30
55 0	2.31	2.34	2.37	2.40	2.44	2.48	2.52	2.56	2.60	2.65	2.70	2.74	55 0
55 30	2.24	2.27	2.30	2.33	2.36	2.40	2.44	2.47	2.51	2.55	2.60	2.65	55 30
56 0	2.17	2.20	2.23	2.26	2.29	2.32	2.36	2.39	2.43	2.46	2.51	2.55	56 0
56 30	2.10	2.13	2.16	2.19	2.22	2.25	2.28	2.31	2.35	2.38	2.42	2.46	56 30
57 0	2.04	2.06	2.09	2.12	2.15	2.17	2.21	2.23	2.27	2.30	2.34	2.37	57 0
57 30	1.98	2.00	2.02	2.05	2.08	2.10	2.13	2.16	2.19	2.22	2.26	2.29	57 30
58 0	1.92	1.94	1.96	1.98	2.01	2.03	2.06	2.09	2.12	2.15	2.18	2.21	58 0
58 30	1.86	1.88	1.90	1.92	1.95	1.97	1.99	2.02	2.05	2.08	2.11	2.13	58 30
59 0	1.81	1.83	1.85	1.87	1.89	1.91	1.93	1.95	1.98	2.01	2.04	2.06	59 0
59 30	1.75	1.77	1.79	1.81	1.83	1.85	1.87	1.89	1.92	1.94	1.97	1.99	59 30
60 0	1.70	1.72	1.74	1.75	1.77	1.79	1.81	1.83	1.86	1.88	1.90	1.92	60 0

TABLE III.—VALUES OF C.

Latitude.		DECLINATION—same Name as—LATITUDE.												Latitude.	
		36 0	36 30	37 0	37 30	38 0	38 30	39 0	39 30	40 0	40 30	41 0	41 30		
0	0	2.70	2.65	2.61	2.56	2.51	2.46	2.42	2.38	2.34	2.30	2.26	2.22	0	0
	30	2.73	2.68	2.64	2.59	2.54	2.49	2.45	2.40	2.36	2.32	2.28	2.24		30
1	0	2.77	2.72	2.67	2.62	2.57	2.52	2.48	2.43	2.39	2.35	2.31	2.26	1	0
	30	2.80	2.75	2.70	2.65	2.60	2.55	2.50	2.45	2.41	2.37	2.33	2.28		30
2	0	2.84	2.78	2.73	2.68	2.63	2.58	2.53	2.48	2.44	2.39	2.35	2.31	2	0
	30	2.87	2.81	2.76	2.71	2.66	2.61	2.56	2.51	2.47	2.42	2.37	2.33		30
3	0	2.91	2.85	2.80	2.74	2.69	2.64	2.59	2.54	2.50	2.45	2.40	2.36	3	0
	30	2.95	2.89	2.83	2.78	2.72	2.67	2.62	2.57	2.52	2.48	2.43	2.38		30
4	0	2.99	2.93	2.87	2.81	2.76	2.70	2.65	2.60	2.55	2.50	2.46	2.41	4	0
	30	3.03	2.97	2.91	2.85	2.79	2.74	2.68	2.63	2.58	2.53	2.48	2.44		30
5	0	3.07	3.01	2.95	2.89	2.83	2.77	2.72	2.66	2.61	2.56	2.51	2.46	5	0
	30	3.11	3.05	2.99	2.92	2.86	2.81	2.75	2.70	2.64	2.59	2.54	2.49		30
6	0	3.16	3.09	3.03	2.96	2.90	2.84	2.79	2.73	2.68	2.62	2.57	2.52	6	0
	30	3.20	3.13	3.07	3.00	2.94	2.88	2.82	2.76	2.71	2.65	2.60	2.55		30
7	0	3.25	3.18	3.11	3.04	2.98	2.92	2.86	2.80	2.74	2.68	2.63	2.58	7	0
	30	3.30	3.23	3.15	3.08	3.02	2.95	2.89	2.83	2.77	2.71	2.66	2.60		30
8	0	3.35	3.27	3.20	3.13	3.06	2.99	2.93	2.87	2.81	2.75	2.69	2.63	8	0
	30	3.40	3.32	3.25	3.17	3.10	3.03	2.97	2.90	2.84	2.78	2.72	2.67		30
9	0	3.46	3.38	3.30	3.22	3.15	3.08	3.01	2.94	2.88	2.82	2.76	2.70	9	0
	30	3.51	3.43	3.35	3.27	3.20	3.12	3.05	2.98	2.92	2.85	2.80	2.73		30
10	0	3.57	3.48	3.40	3.32	3.25	3.17	3.10	3.03	2.96	2.89	2.83	2.77	10	0
	30	3.63	3.54	3.45	3.37	3.30	3.22	3.14	3.07	3.00	2.93	2.87	2.80		30
11	0	3.69	3.60	3.51	3.43	3.35	3.27	3.19	3.12	3.05	2.98	2.91	2.84	11	0
	30	3.75	3.66	3.57	3.48	3.40	3.32	3.24	3.16	3.09	3.02	2.95	2.88		30
12	0	3.82	3.72	3.63	3.54	3.45	3.37	3.29	3.21	3.13	3.06	2.99	2.92	12	0
	30	3.89	3.79	3.69	3.60	3.51	3.42	3.34	3.26	3.18	3.10	3.03	2.96		30
13	0	3.96	3.86	3.76	3.66	3.57	3.48	3.39	3.31	3.23	3.15	3.08	3.00	13	0
	30	4.03	3.93	3.82	3.72	3.62	3.53	3.44	3.36	3.28	3.20	3.12	3.05		30
14	0	4.11	4.00	3.89	3.79	3.69	3.59	3.50	3.41	3.33	3.25	3.17	3.09	14	0
	30	4.19	4.08	3.96	3.86	3.75	3.65	3.56	3.47	3.38	3.30	3.22	3.13		30
15	0	4.28	4.16	4.04	3.93	3.82	3.72	3.62	3.53	3.44	3.35	3.27	3.18	15	0
	30	4.37	4.24	4.12	4.01	3.89	3.79	3.68	3.59	3.49	3.40	3.32	3.23		30
16	0	4.46	4.33	4.21	4.09	3.97	3.86	3.75	3.65	3.55	3.46	3.37	3.28	16	0
	30	4.56	4.42	4.29	4.17	4.05	3.99	3.82	3.72	3.61	3.52	3.42	3.33		30
17	0	4.67	4.52	4.38	4.25	4.13	4.02	3.90	3.79	3.68	3.58	3.48	3.39	17	0
	30	4.78	4.62	4.48	4.34	4.21	4.09	3.97	3.86	3.75	3.64	3.54	3.44		30
18	0	4.89	4.73	4.58	4.44	4.30	4.17	4.05	3.93	3.82	3.71	3.61	3.51	18	0
	30	5.01	4.84	4.69	4.54	4.39	4.26	4.13	4.01	3.89	3.78	3.67	3.57		30
19	0	5.14	4.96	4.80	4.64	4.49	4.35	4.22	4.09	3.97	3.85	3.74	3.63	19	0
	30	5.27	5.09	4.92	4.75	4.59	4.45	4.31	4.17	4.05	3.93	3.81	3.70		30
20	0	5.42	5.22	5.04	4.87	4.70	4.55	4.40	4.26	4.13	4.01	3.89	3.77	20	0
	30	5.56	5.36	5.17	4.99	4.82	4.66	4.50	4.36	4.22	4.09	3.96	3.84		30
21	0	5.73	5.51	5.31	5.12	4.94	4.77	4.61	4.46	4.31	4.17	4.04	3.92	21	0
	30	5.91	5.68	5.46	5.25	5.07	4.89	4.72	4.56	4.41	4.26	4.13	4.00		30
22	0	6.09	5.85	5.62	5.41	5.20	5.02	4.84	4.67	4.51	4.36	4.22	4.09	22	0
	30	6.28	6.03	5.79	5.56	5.35	5.15	4.96	4.79	4.62	4.46	4.31	4.17		30
23	0	6.50	6.22	5.97	5.73	5.50	5.29	5.10	4.91	4.74	4.57	4.41	4.27	23	0
	30	6.73	6.43	6.16	5.90	5.67	5.44	5.23	5.04	4.85	4.68	4.52	4.36		30
24	0	6.98	6.66	6.37	6.10	5.84	5.61	5.39	5.18	4.99	4.80	4.63	4.47	24	0
	30	7.24	6.91	6.59	6.30	6.03	5.78	5.54	5.33	5.12	4.93	4.74	4.57		30
25	0	7.54	7.17	6.84	6.52	6.23	5.97	5.72	5.48	5.27	5.06	4.87	4.69	25	0
	30	7.86	7.46	7.09	6.76	6.45	6.16	5.90	5.65	5.42	5.21	5.00	4.81		30
26	0	8.22	7.78	7.39	7.02	6.69	6.38	6.10	5.83	5.59	5.36	5.15	4.95	26	0
	30	8.61	8.13	7.70	7.31	6.94	6.61	6.31	6.03	5.76	5.52	5.29	5.08		30
27	0	9.05	8.52	8.05	7.62	7.23	6.87	6.54	6.24	5.96	5.70	5.46	5.23	27	0
	30	9.53	8.95	8.42	7.96	7.53	7.14	6.79	6.46	6.16	5.89	5.63	5.39		30
28	0	10.08	9.43	8.85	8.33	7.87	7.44	7.06	6.71	6.39	6.09	5.82	5.56	28	0
	30	10.70	9.97	9.32	8.75	8.23	7.78	7.35	6.98	6.63	6.31	6.01	5.74		30
29	0	11.40	10.58	9.85	9.22	8.65	8.14	7.69	7.27	6.90	6.55	6.23	5.94	29	0
	30	12.21	11.27	10.46	9.74	9.11	8.55	8.04	7.59	7.18	6.81	6.47	6.15		30
30	0	13.16	12.07	11.14	10.34	9.63	9.00	8.45	7.95	7.50	7.10	6.73	6.39	30	0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	36 0	36 30	37 0	37 30	38 0	38 30	39 0	39 30	40 0	40 30	41 0	41 30	
30 0	13.16	12.07	11.14	10.34	9.63	9.00	8.45	7.95	7.50	7.10	6.73	6.39	30 0
30 30	14.28	13.01	11.93	11.01	10.21	9.52	8.89	8.34	7.85	7.40	7.01	6.64	30 30
31 0	15.62	14.12	12.86	11.80	10.88	10.09	9.40	8.79	8.24	7.75	7.31	6.92	31 0
31 30	17.26	15.44	13.95	12.75	11.65	10.75	9.96	9.28	8.68	8.13	7.65	7.22	31 30
32 0	19.31	17.06	15.26	13.78	12.55	11.51	10.62	9.84	9.16	8.57	8.03	7.56	32 0
32 30	21.94	19.08	16.85	15.07	13.61	12.39	11.36	10.48	9.71	9.04	8.45	7.92	32 30
33 0	25.46	21.68	18.85	16.65	14.89	13.45	12.24	11.22	10.35	9.59	8.93	8.34	33 0
33 30		25.15	21.41	18.62	16.44	14.70	13.27	12.08	11.07	10.21	9.46	8.81	33 30
34 0			24.84	21.15	18.39	16.23	14.51	13.10	11.93	10.93	10.08	9.33	34 0
34 30				24.53	20.88	18.15	16.02	14.32	12.93	11.77	10.78	9.94	34 30
35 0					24.22	20.62	17.92	15.82	14.14	12.76	11.61	10.64	35 0
35 30						23.90	20.34	17.68	15.60	13.94	12.58	11.45	35 30
36 0							23.58	20.07	17.44	15.39	13.75	12.41	36 0
36 30								23.26	19.80	17.20	15.18	13.56	36 30
37 0									22.95	19.53	16.97	14.97	37 0
37 30										22.63	19.26	16.73	37 30
38 0											22.31	18.98	38 0
38 30												21.99	38 30
39 0	23.58												39 0
39 30	20.07	23.26											39 30
40 0	17.44	19.80	22.95										40 0
40 30	15.39	17.20	19.53	22.63									40 30
41 0	13.75	15.18	16.97	19.26	22.31								41 0
41 30	12.41	13.56	14.97	16.73	18.98	21.99							41 30
42 0	11.29	12.23	13.37	14.76	16.48	18.71	21.67						42 0
42 30	10.34	11.13	12.06	13.18	14.54	16.24	18.43	21.34					42 30
43 0	9.53	10.19	10.97	11.89	12.98	14.32	16.00	18.15	21.02				43 0
43 30	8.82	9.39	10.05	10.81	11.71	12.79	14.10	15.75	17.87	20.69			43 30
44 0	8.21	8.69	9.26	9.90	10.65	11.53	12.59	13.89	15.51	17.59	20.36		44 0
44 30	7.66	8.09	8.57	9.12	9.75	10.49	11.35	12.40	13.67	15.26	17.31	20.04	44 30
45 0	7.18	7.55	7.97	8.44	8.98	9.60	10.32	11.18	12.20	13.45	15.02	17.03	45 0
45 30	6.74	7.07	7.44	7.84	8.31	8.84	9.45	10.16	11.00	12.00	13.23	14.78	45 30
46 0	6.36	6.64	6.96	7.32	7.72	8.18	8.70	9.30	10.00	10.82	11.80	13.02	46 0
46 30	6.00	6.26	6.54	6.85	7.20	7.59	8.05	8.56	9.14	9.83	10.64	11.61	46 30
47 0	5.68	5.90	6.16	6.44	6.75	7.09	7.47	7.92	8.42	8.99	9.67	10.46	47 0
47 30	5.38	5.59	5.81	6.06	6.33	6.63	6.97	7.35	7.78	8.28	8.84	9.51	47 30
48 0	5.11	5.29	5.50	5.72	5.96	6.23	6.52	6.86	7.23	7.65	8.14	8.69	48 0
48 30	4.86	5.03	5.21	5.41	5.62	5.86	6.12	6.42	6.74	7.10	7.52	8.00	48 30
49 0	4.63	4.78	4.95	5.13	5.31	5.53	5.76	6.02	6.31	6.62	6.98	7.39	49 0
49 30	4.41	4.55	4.71	4.87	5.04	5.23	5.43	5.67	5.91	6.20	6.50	6.86	49 30
50 0	4.22	4.34	4.48	4.63	4.78	4.95	5.14	5.34	5.57	5.81	6.09	6.39	50 0
50 30	4.03	4.15	4.27	4.40	4.55	4.70	4.86	5.05	5.24	5.47	5.71	5.98	50 30
51 0	3.86	3.96	4.08	4.20	4.33	4.47	4.62	4.78	4.96	5.15	5.37	5.61	51 0
51 30	3.70	3.79	3.90	4.01	4.13	4.25	4.39	4.54	4.69	4.87	5.06	5.27	51 30
52 0	3.55	3.63	3.73	3.83	3.94	4.06	4.18	4.31	4.45	4.61	4.78	4.97	52 0
52 30	3.40	3.48	3.57	3.66	3.77	3.87	3.99	4.10	4.23	4.37	4.52	4.69	52 30
53 0	3.27	3.34	3.42	3.51	3.60	3.70	3.80	3.91	4.02	4.15	4.29	4.44	53 0
53 30	3.14	3.21	3.28	3.36	3.45	3.53	3.63	3.72	3.83	3.95	4.07	4.21	53 30
54 0	3.02	3.08	3.15	3.22	3.30	3.38	3.47	3.56	3.65	3.76	3.87	3.99	54 0
54 30	2.90	2.96	3.03	3.09	3.17	3.24	3.32	3.40	3.49	3.58	3.68	3.80	54 30
55 0	2.79	2.85	2.91	2.97	3.04	3.11	3.18	3.25	3.33	3.42	3.51	3.61	55 0
55 30	2.69	2.74	2.80	2.85	2.92	2.98	3.05	3.11	3.19	3.27	3.35	3.44	55 30
56 0	2.60	2.64	2.69	2.74	2.80	2.86	2.92	2.98	3.05	3.12	3.20	3.28	56 0
56 30	2.50	2.55	2.59	2.64	2.69	2.74	2.80	2.86	2.92	2.99	3.06	3.14	56 30
57 0	2.41	2.45	2.50	2.54	2.59	2.63	2.69	2.74	2.80	2.86	2.93	3.00	57 0
57 30	2.33	2.36	2.41	2.45	2.49	2.53	2.58	2.63	2.69	2.74	2.80	2.87	57 30
58 0	2.25	2.28	2.32	2.36	2.40	2.44	2.48	2.52	2.58	2.63	2.68	2.74	58 0
58 30	2.17	2.20	2.24	2.27	2.31	2.35	2.39	2.43	2.47	2.52	2.58	2.63	58 30
59 0	2.09	2.12	2.16	2.19	2.22	2.26	2.30	2.34	2.38	2.42	2.47	2.53	59 0
59 30	2.02	2.04	2.08	2.11	2.14	2.17	2.21	2.25	2.29	2.33	2.37	2.42	59 30
60 0	1.95	1.97	2.00	2.04	2.07	2.10	2.13	2.16	2.20	2.24	2.28	2.32	60 0

Altitude above 87°

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	42 0	42 30	43 0	43 30	44 0	44 30	45 0	45 30	46 0	46 30	47 0	47 30	
0 0	2.18	2.14	2.11	2.07	2.03	1.99	1.96	1.93	1.90	1.86	1.83	1.80	0 0
30	2.20	2.16	2.13	2.09	2.05	2.01	1.98	1.94	1.91	1.87	1.84	1.81	30
1 0	2.22	2.18	2.15	2.11	2.07	2.03	2.00	1.96	1.93	1.89	1.86	1.83	1 0
30	2.24	2.20	2.17	2.13	2.09	2.05	2.01	1.97	1.94	1.90	1.87	1.84	30
2 0	2.27	2.23	2.19	2.15	2.11	2.07	2.03	1.99	1.96	1.92	1.89	1.86	2 0
30	2.29	2.25	2.21	2.17	2.13	2.09	2.05	2.01	1.98	1.94	1.91	1.87	30
3 0	2.32	2.27	2.23	2.19	2.15	2.11	2.07	2.03	2.00	1.96	1.93	1.89	3 0
30	2.34	2.30	2.25	2.21	2.17	2.13	2.09	2.05	2.01	1.98	1.94	1.91	30
4 0	2.36	2.32	2.28	2.23	2.19	2.15	2.11	2.07	2.03	1.99	1.96	1.92	4 0
30	2.39	2.34	2.30	2.26	2.21	2.17	2.13	2.09	2.05	2.01	1.97	1.94	30
5 0	2.42	2.37	2.32	2.28	2.24	2.19	2.15	2.11	2.07	2.03	1.99	1.95	5 0
30	2.44	2.39	2.34	2.30	2.26	2.21	2.17	2.13	2.09	2.05	2.01	1.97	30
6 0	2.47	2.42	2.37	2.32	2.28	2.23	2.19	2.15	2.11	2.07	2.03	1.99	6 0
30	2.50	2.44	2.39	2.35	2.30	2.26	2.21	2.17	2.13	2.09	2.05	2.01	30
7 0	2.53	2.47	2.42	2.37	2.33	2.28	2.24	2.19	2.15	2.11	2.07	2.03	7 0
30	2.55	2.50	2.45	2.40	2.35	2.30	2.26	2.21	2.17	2.13	2.09	2.04	30
8 0	2.58	2.53	2.48	2.43	2.38	2.33	2.28	2.23	2.19	2.15	2.11	2.06	8 0
30	2.61	2.56	2.51	2.45	2.40	2.35	2.30	2.26	2.21	2.17	2.13	2.08	30
9 0	2.65	2.59	2.54	2.48	2.43	2.38	2.33	2.28	2.24	2.19	2.15	2.10	9 0
30	2.67	2.63	2.57	2.51	2.46	2.40	2.35	2.31	2.26	2.21	2.17	2.12	30
10 0	2.71	2.65	2.60	2.54	2.49	2.43	2.38	2.33	2.29	2.24	2.19	2.14	10 0
30	2.74	2.68	2.63	2.57	2.51	2.46	2.41	2.35	2.31	2.26	2.21	2.16	30
11 0	2.78	2.72	2.66	2.60	2.55	2.49	2.44	2.38	2.33	2.29	2.24	2.19	11 0
30	2.81	2.75	2.69	2.63	2.58	2.52	2.46	2.41	2.36	2.31	2.26	2.21	30
12 0	2.85	2.79	2.73	2.67	2.61	2.55	2.49	2.44	2.39	2.33	2.28	2.23	12 0
30	2.89	2.82	2.76	2.70	2.64	2.58	2.52	2.46	2.41	2.36	2.30	2.25	30
13 0	2.93	2.86	2.80	2.73	2.67	2.61	2.55	2.49	2.44	2.38	2.33	2.28	13 0
30	2.97	2.90	2.83	2.77	2.70	2.64	2.58	2.52	2.47	2.41	2.36	2.30	30
14 0	3.02	2.94	2.87	2.80	2.74	2.68	2.62	2.56	2.50	2.45	2.39	2.33	14 0
30	3.06	2.98	2.91	2.84	2.77	2.71	2.65	2.59	2.53	2.47	2.41	2.36	30
15 0	3.10	3.02	2.95	2.88	2.81	2.74	2.68	2.62	2.56	2.50	2.44	2.38	15 0
30	3.15	3.07	2.99	2.92	2.85	2.78	2.71	2.65	2.59	2.53	2.47	2.41	30
16 0	3.20	3.12	3.04	2.96	2.89	2.82	2.75	2.68	2.62	2.56	2.50	2.44	16 0
30	3.25	3.16	3.08	3.01	2.93	2.86	2.79	2.72	2.65	2.59	2.53	2.47	30
17 0	3.30	3.21	3.13	3.05	2.98	2.90	2.83	2.76	2.69	2.62	2.56	2.50	17 0
30	3.35	3.26	3.18	3.09	3.02	2.94	2.86	2.79	2.72	2.66	2.59	2.53	30
18 0	3.41	3.32	3.23	3.14	3.06	2.98	2.91	2.83	2.76	2.69	2.63	2.56	18 0
30	3.47	3.37	3.28	3.19	3.10	3.02	2.95	2.87	2.80	2.73	2.66	2.59	30
19 0	3.53	3.43	3.34	3.25	3.16	3.07	2.99	2.91	2.84	2.76	2.69	2.62	19 0
30	3.59	3.49	3.39	3.30	3.21	3.12	3.04	2.95	2.88	2.80	2.73	2.66	30
20 0	3.66	3.55	3.45	3.35	3.26	3.17	3.09	3.00	2.92	2.84	2.77	2.70	20 0
30	3.73	3.62	3.51	3.41	3.31	3.22	3.14	3.05	2.96	2.88	2.81	2.73	30
21 0	3.80	3.69	3.58	3.47	3.37	3.28	3.19	3.10	3.01	2.93	2.85	2.77	21 0
30	3.88	3.76	3.65	3.54	3.43	3.33	3.24	3.15	3.06	2.97	2.89	2.81	30
22 0	3.96	3.84	3.72	3.61	3.50	3.39	3.29	3.20	3.11	3.02	2.94	2.86	22 0
30	4.04	3.91	3.79	3.67	3.56	3.45	3.35	3.25	3.16	3.07	2.98	2.90	30
23 0	4.13	3.99	3.86	3.74	3.63	3.52	3.41	3.31	3.21	3.12	3.03	2.94	23 0
30	4.22	4.08	3.94	3.81	3.69	3.58	3.47	3.37	3.27	3.17	3.08	2.99	30
24 0	4.31	4.17	4.03	3.90	3.77	3.65	3.54	3.43	3.33	3.23	3.13	3.04	24 0
30	4.41	4.26	4.12	3.98	3.85	3.72	3.60	3.49	3.39	3.29	3.19	3.09	30
25 0	4.52	4.36	4.21	4.07	3.93	3.81	3.68	3.56	3.45	3.35	3.25	3.15	25 0
30	4.63	4.46	4.31	4.16	4.02	3.88	3.75	3.63	3.51	3.40	3.30	3.20	30
26 0	4.76	4.58	4.41	4.26	4.11	3.97	3.83	3.70	3.58	3.47	3.36	3.25	26 0
30	4.89	4.70	4.52	4.35	4.20	4.05	3.91	3.78	3.65	3.53	3.42	3.31	30
27 0	5.02	4.83	4.64	4.47	4.30	4.15	4.00	3.86	3.73	3.61	3.49	3.38	27 0
30	5.16	4.96	4.77	4.58	4.41	4.25	4.09	3.95	3.81	3.68	3.56	3.44	30
28 0	5.33	5.10	4.90	4.71	4.52	4.35	4.20	4.04	3.90	3.76	3.63	3.51	28 0
30	5.49	5.26	5.03	4.83	4.64	4.46	4.29	4.14	3.98	3.84	3.71	3.58	30
29 0	5.67	5.42	5.19	4.97	4.77	4.58	4.41	4.24	4.08	3.93	3.79	3.66	29 0
30	5.86	5.60	5.35	5.12	4.90	4.71	4.52	4.35	4.18	4.02	3.87	3.73	30
30 0	6.08	5.79	5.53	5.28	5.06	4.84	4.65	4.46	4.29	4.12	3.97	3.82	30 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>same Name as</i> —LATITUDE.														Latitude.
	42 0	42 30	43 0	43 30	44 0	44 30	45 0	45 30	46 0	46 30	47 0	47 30			
30 0	6.08	5.79	5.53	5.28	5.06	4.84	4.65	4.46	4.29	4.12	3.97	3.82	30 0		
30 30	6.30	6.00	5.71	5.45	5.21	4.99	4.77	4.58	4.40	4.22	4.06	3.91	30 30		
31 0	6.56	6.22	5.92	5.64	5.38	5.14	4.92	4.71	4.52	4.34	4.16	4.00	31 0		
30 30	6.83	6.47	6.14	5.84	5.56	5.30	5.07	4.85	4.64	4.45	4.27	4.10	30 30		
32 0	7.13	6.74	6.38	6.06	5.76	5.49	5.23	5.00	4.78	4.58	4.39	4.21	32 0		
30 30	7.46	7.03	6.65	6.29	5.97	5.68	5.41	5.15	4.93	4.71	4.51	4.32	30 30		
33 0	7.82	7.36	6.94	6.56	6.21	5.89	5.60	5.33	5.08	4.86	4.64	4.44	33 0		
30 30	8.22	7.71	7.25	6.84	6.46	6.12	5.80	5.52	5.25	5.00	4.78	4.57	30 30		
34 0	8.69	8.11	7.61	7.15	6.74	6.37	6.03	5.72	5.44	5.17	4.93	4.71	34 0		
30 30	9.20	8.57	8.00	7.50	7.05	6.64	6.28	5.94	5.63	5.36	5.09	4.85	30 30		
35 0	9.81	9.08	8.45	7.89	7.40	6.95	6.55	6.19	5.86	5.55	5.28	5.02	35 0		
30 30	10.49	9.67	8.95	8.33	7.77	7.29	6.84	6.45	6.09	5.77	5.46	5.19	30 30		
36 0	11.29	10.34	9.53	8.82	8.21	7.66	7.18	6.74	6.36	6.00	5.68	5.38	36 0		
30 30	12.23	11.13	10.19	9.39	8.69	8.09	7.55	7.07	6.64	6.26	5.90	5.59	30 30		
37 0	13.37	12.06	10.97	10.05	9.26	8.57	7.97	7.44	6.96	6.54	6.16	5.81	37 0		
30 30	14.76	13.18	11.89	10.81	9.90	9.12	8.44	7.84	7.32	6.85	6.44	6.06	30 30		
38 0	16.48	14.54	12.98	11.71	10.65	9.75	8.98	8.31	7.72	7.20	6.75	6.33	38 0		
30 30	18.71	16.24	14.32	12.79	11.53	10.49	9.60	8.84	8.18	7.59	7.09	6.63	30 30		
39 0	21.67	18.43	16.00	14.10	12.59	11.35	10.32	9.45	8.70	8.05	7.47	6.97	39 0		
30 30		21.34	18.15	15.75	13.89	12.40	11.18	10.16	9.30	8.56	7.92	7.35	30 30		
40 0			21.02	17.87	15.51	13.67	12.20	11.00	10.00	9.14	8.42	7.78	40 0		
30 30				20.69	17.59	15.26	13.45	12.00	10.82	9.93	8.99	8.28	30 30		
41 0					20.36	17.31	15.02	13.23	11.80	10.64	9.67	8.84	41 0		
30 30						20.04	17.03	14.78	13.02	11.61	10.46	9.51	30 30		
42 0							19.71	16.75	14.53	12.79	11.41	10.28	42 0		
30 30								19.38	16.47	14.27	12.57	11.21	30 30		
43 0									19.06	16.19	14.02	12.36	43 0		
30 30										18.73	15.91	13.78	30 30		
44 0											18.40	15.63	44 0		
30 30												18.08	30 30		
45 0	19.71												45 0		
30 30	16.75	19.38											30 30		
46 0	14.53	16.47	19.06										46 0		
30 30	12.79	14.27	16.19	18.73									30 30		
47 0	11.41	12.57	14.02	15.91	18.40								47 0		
30 30	10.28	11.21	12.36	13.78	15.63	18.08							30 30		
48 0	9.34	10.10	11.02	12.14	13.55	15.35	17.75						48 0		
30 30	8.53	9.17	9.92	10.82	11.92	13.30	15.07	17.42					30 30		
49 0	7.85	8.38	9.01	9.74	10.63	11.71	13.06	14.79	17.10				49 0		
30 30	7.26	7.71	8.23	8.85	9.56	10.44	11.49	12.81	14.51	16.77			30 30		
50 0	6.74	7.13	7.57	8.08	8.69	9.39	10.24	11.27	12.57	14.23	16.45		50 0		
30 30	6.27	6.61	7.00	7.43	7.93	8.52	9.21	10.04	11.06	12.32	13.95	16.12	30 30		
51 0	5.87	6.15	6.49	6.87	7.29	7.78	8.35	9.03	9.85	10.84	12.08	13.68	51 0		
30 30	5.50	5.76	6.03	6.37	6.74	7.15	7.63	8.19	8.86	9.65	10.62	11.84	30 30		
52 0	5.17	5.40	5.65	5.92	6.25	6.61	7.01	7.48	8.03	8.68	9.46	10.41	52 0		
30 30	4.87	5.07	5.30	5.54	5.81	6.13	6.47	6.87	7.34	7.87	8.50	9.26	30 30		
53 0	4.60	4.78	4.97	5.20	5.44	5.70	6.00	6.34	6.74	7.19	7.71	8.33	53 0		
30 30	4.35	4.51	4.69	4.87	5.10	5.32	5.59	5.88	6.22	6.60	7.04	7.55	30 30		
54 0	4.12	4.26	4.42	4.59	4.78	4.99	5.22	5.47	5.76	6.09	6.46	6.89	54 0		
30 30	3.91	4.04	4.18	4.34	4.50	4.68	4.88	5.11	5.36	5.64	5.96	6.32	30 30		
55 0	3.72	3.83	3.96	4.09	4.25	4.41	4.59	4.78	5.00	5.24	5.52	5.83	55 0		
30 30	3.53	3.64	3.75	3.88	4.01	4.16	4.31	4.49	4.68	4.89	5.13	5.40	30 30		
56 0	3.37	3.46	3.57	3.67	3.80	3.93	4.07	4.22	4.39	4.58	4.79	5.02	56 0		
30 30	3.21	3.30	3.39	3.49	3.59	3.72	3.84	3.97	4.13	4.29	4.48	4.68	30 30		
57 0	3.07	3.14	3.23	3.32	3.42	3.52	3.64	3.76	3.89	4.04	4.20	4.38	57 0		
30 30	2.93	3.00	3.08	3.16	3.25	3.34	3.45	3.56	3.68	3.80	3.95	4.10	30 30		
58 0	2.80	2.87	2.94	3.01	3.09	3.18	3.27	3.37	3.48	3.59	3.72	3.86	58 0		
30 30	2.69	2.74	2.81	2.87	2.94	3.02	3.11	3.19	3.29	3.40	3.51	3.63	30 30		
59 0	2.58	2.63	2.68	2.74	2.81	2.88	2.96	3.03	3.12	3.21	3.32	3.43	59 0		
30 30	2.47	2.52	2.57	2.62	2.68	2.75	2.81	2.89	2.96	3.05	3.14	3.24	30 30		
60 0	2.36	2.41	2.46	2.51	2.56	2.62	2.68	2.75	2.82	2.90	2.98	3.07	60 0		

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>same Name as</i> —LATITUDE.												Latitude.
	48 0	48 30	49 0	49 30	50 0	50 30	51 0	51 30	52 0	52 30	53 0	53 30	
0 0	1.77	1.74	1.71	1.68	1.65	1.62	1.59	1.56	1.53	1.50	1.48	1.45	0 0
30	1.78	1.75	1.72	1.69	1.66	1.63	1.60	1.57	1.54	1.51	1.49	1.46	30
1 0	1.80	1.76	1.73	1.70	1.67	1.64	1.61	1.58	1.56	1.53	1.50	1.47	1 0
30	1.81	1.77	1.74	1.71	1.68	1.65	1.62	1.59	1.57	1.54	1.51	1.48	30
2 0	1.83	1.79	1.76	1.73	1.70	1.67	1.64	1.61	1.58	1.55	1.52	1.49	2 0
30	1.84	1.80	1.77	1.74	1.71	1.68	1.65	1.62	1.59	1.56	1.53	1.50	30
3 0	1.86	1.82	1.79	1.75	1.72	1.69	1.66	1.63	1.60	1.57	1.54	1.51	3 0
30	1.87	1.84	1.80	1.77	1.73	1.70	1.67	1.64	1.61	1.58	1.55	1.52	30
4 0	1.89	1.85	1.82	1.78	1.75	1.72	1.69	1.65	1.62	1.59	1.56	1.53	4 0
30	1.90	1.87	1.83	1.80	1.76	1.73	1.70	1.67	1.63	1.60	1.57	1.54	30
5 0	1.92	1.88	1.85	1.81	1.78	1.74	1.71	1.68	1.65	1.61	1.58	1.55	5 0
30	1.93	1.90	1.86	1.83	1.79	1.76	1.72	1.69	1.66	1.63	1.59	1.56	30
6 0	1.95	1.91	1.88	1.84	1.81	1.77	1.74	1.70	1.67	1.64	1.61	1.57	6 0
30	1.97	1.93	1.89	1.86	1.82	1.79	1.75	1.72	1.68	1.65	1.62	1.59	30
7 0	1.99	1.95	1.91	1.87	1.84	1.80	1.77	1.73	1.70	1.66	1.63	1.60	7 0
30	2.00	1.96	1.92	1.88	1.85	1.81	1.78	1.74	1.71	1.67	1.64	1.61	30
8 0	2.02	1.98	1.94	1.90	1.87	1.83	1.79	1.75	1.72	1.68	1.65	1.62	8 0
30	2.04	2.00	1.96	1.92	1.88	1.84	1.80	1.77	1.73	1.70	1.66	1.63	30
9 0	2.06	2.02	1.98	1.94	1.90	1.86	1.82	1.78	1.75	1.71	1.68	1.64	9 0
30	2.08	2.04	2.00	1.96	1.91	1.87	1.83	1.80	1.76	1.73	1.69	1.66	30
10 0	2.10	2.06	2.02	1.97	1.93	1.89	1.85	1.81	1.78	1.74	1.71	1.67	10 0
30	2.12	2.07	2.03	1.99	1.95	1.91	1.87	1.83	1.79	1.75	1.72	1.68	30
11 0	2.14	2.09	2.05	2.01	1.97	1.93	1.89	1.85	1.81	1.77	1.73	1.69	11 0
30	2.17	2.12	2.07	2.03	1.99	1.94	1.90	1.86	1.82	1.78	1.74	1.70	30
12 0	2.19	2.14	2.09	2.05	2.01	1.96	1.92	1.88	1.84	1.80	1.76	1.72	12 0
30	2.21	2.16	2.11	2.06	2.02	1.98	1.94	1.89	1.85	1.81	1.77	1.73	30
13 0	2.23	2.18	2.13	2.08	2.04	2.00	1.96	1.91	1.87	1.83	1.79	1.75	13 0
30	2.25	2.20	2.15	2.10	2.06	2.01	1.97	1.93	1.89	1.84	1.80	1.76	30
14 0	2.28	2.23	2.18	2.13	2.08	2.03	1.99	1.95	1.91	1.86	1.82	1.78	14 0
30	2.30	2.25	2.20	2.15	2.10	2.05	2.01	1.96	1.92	1.88	1.83	1.79	30
15 0	2.33	2.28	2.23	2.18	2.13	2.08	2.03	1.98	1.94	1.89	1.85	1.81	15 0
30	2.35	2.30	2.25	2.20	2.15	2.10	2.05	2.00	1.96	1.91	1.87	1.82	30
16 0	2.38	2.32	2.27	2.22	2.17	2.12	2.07	2.02	1.98	1.93	1.89	1.84	16 0
30	2.41	2.35	2.29	2.24	2.19	2.14	2.09	2.04	2.00	1.95	1.90	1.86	30
17 0	2.44	2.38	2.32	2.27	2.22	2.16	2.11	2.06	2.02	1.97	1.92	1.87	17 0
30	2.47	2.41	2.35	2.29	2.24	2.19	2.13	2.08	2.03	1.99	1.94	1.89	30
18 0	2.50	2.44	2.38	2.32	2.27	2.21	2.16	2.11	2.06	2.01	1.96	1.91	18 0
30	2.53	2.47	2.41	2.35	2.29	2.23	2.18	2.13	2.08	2.03	1.98	1.93	30
19 0	2.56	2.50	2.44	2.38	2.32	2.26	2.20	2.15	2.10	2.05	2.00	1.95	19 0
30	2.59	2.53	2.47	2.40	2.34	2.28	2.22	2.17	2.12	2.07	2.02	1.97	30
20 0	2.63	2.56	2.50	2.43	2.37	2.31	2.25	2.19	2.14	2.09	2.04	1.99	20 0
30	2.66	2.59	2.53	2.46	2.40	2.34	2.28	2.22	2.16	2.11	2.06	2.01	30
21 0	2.70	2.63	2.56	2.49	2.43	2.37	2.31	2.25	2.19	2.13	2.08	2.03	21 0
30	2.74	2.66	2.59	2.52	2.46	2.39	2.33	2.27	2.21	2.16	2.10	2.05	30
22 0	2.78	2.70	2.63	2.56	2.49	2.42	2.36	2.30	2.24	2.18	2.13	2.07	22 0
30	2.82	2.74	2.66	2.59	2.52	2.45	2.39	2.33	2.27	2.21	2.15	2.09	30
23 0	2.86	2.78	2.70	2.63	2.56	2.49	2.42	2.36	2.30	2.24	2.18	2.12	23 0
30	2.90	2.82	2.74	2.66	2.59	2.52	2.45	2.39	2.32	2.26	2.20	2.14	30
24 0	2.95	2.86	2.78	2.70	2.63	2.56	2.49	2.42	2.35	2.29	2.23	2.17	24 0
30	3.00	2.91	2.83	2.74	2.67	2.59	2.52	2.45	2.38	2.31	2.25	2.19	30
25 0	3.05	2.96	2.88	2.79	2.71	2.63	2.56	2.48	2.41	2.34	2.27	2.21	25 0
30	3.10	3.01	2.92	2.83	2.75	2.67	2.59	2.52	2.44	2.37	2.30	2.24	30
26 0	3.15	3.06	2.97	2.88	2.79	2.71	2.63	2.55	2.48	2.41	2.34	2.27	26 0
30	3.20	3.10	3.01	2.92	2.83	2.75	2.67	2.59	2.51	2.44	2.37	2.30	30
27 0	3.27	3.16	3.06	2.97	2.88	2.79	2.71	2.63	2.55	2.47	2.40	2.33	27 0
30	3.33	3.22	3.11	3.01	2.92	2.83	2.74	2.66	2.58	2.51	2.43	2.36	30
28 0	3.39	3.28	3.17	3.07	2.97	2.88	2.79	2.70	2.62	2.54	2.47	2.39	28 0
30	3.46	3.34	3.23	3.12	3.03	2.93	2.84	2.75	2.66	2.58	2.52	2.43	30
29 0	3.53	3.41	3.29	3.19	3.08	2.99	2.89	2.80	2.71	2.62	2.54	2.46	29 0
30	3.60	3.48	3.36	3.24	3.14	3.05	2.94	2.84	2.75	2.66	2.58	2.50	30
30 0	3.68	3.55	3.43	3.31	3.20	3.09	2.99	2.89	2.79	2.70	2.62	2.54	30 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	48 0	48 30	49 0	49 30	50 0	50 30	51 0	51 30	52 0	52 30	53 0	53 30	
30 0	3.68	3.55	3.43	3.31	3.20	3.09	2.99	2.89	2.79	2.70	2.62	2.54	30 0
30 30	3.76	3.62	3.49	3.37	3.26	3.15	3.04	2.94	2.84	2.74	2.65	2.57	30 30
31 0	3.85	3.71	3.57	3.44	3.32	3.21	3.10	2.99	2.89	2.79	2.70	2.61	31 0
30 30	3.94	3.79	3.65	3.51	3.38	3.27	3.16	3.05	2.94	2.84	2.74	2.65	30 30
32 0	4.04	3.88	3.74	3.60	3.46	3.33	3.22	3.11	3.00	2.90	2.80	2.70	32 0
30 30	4.14	3.98	3.82	3.68	3.54	3.40	3.28	3.16	3.05	2.95	2.85	2.75	30 30
33 0	4.26	4.08	3.92	3.77	3.62	3.49	3.35	3.23	3.11	3.00	2.90	2.80	33 0
30 30	4.37	4.19	4.01	3.86	3.70	3.56	3.43	3.29	3.17	3.05	2.95	2.85	30 30
34 0	4.50	4.30	4.12	3.95	3.80	3.64	3.50	3.37	3.24	3.12	3.01	2.90	34 0
30 30	4.63	4.43	4.23	4.05	3.89	3.73	3.58	3.44	3.31	3.18	3.06	2.95	30 30
35 0	4.78	4.56	4.36	4.17	3.99	3.83	3.67	3.52	3.39	3.26	3.13	3.01	35 0
30 30	4.94	4.70	4.48	4.29	4.10	3.92	3.76	3.61	3.46	3.33	3.20	3.07	30 30
36 0	5.11	4.86	4.63	4.41	4.22	4.03	3.86	3.70	3.55	3.40	3.28	3.14	36 0
30 30	5.29	5.03	4.78	4.55	4.34	4.15	3.96	3.79	3.63	3.48	3.34	3.21	30 30
37 0	5.50	5.21	4.95	4.71	4.48	4.27	4.08	3.90	3.73	3.57	3.42	3.28	37 0
30 30	5.72	5.41	5.13	4.87	4.63	4.40	4.20	4.01	3.83	3.66	3.51	3.36	30 30
38 0	5.96	5.62	5.31	5.04	4.78	4.55	4.33	4.13	3.94	3.77	3.60	3.45	38 0
30 30	6.23	5.86	5.53	5.23	4.95	4.70	4.47	4.25	4.06	3.87	3.70	3.53	30 30
39 0	6.52	6.12	5.76	5.43	5.14	4.86	4.62	4.39	4.18	3.99	3.80	3.63	39 0
30 30	6.86	6.42	6.02	5.67	5.34	5.05	4.78	4.54	4.31	4.10	3.91	3.72	30 30
40 0	7.23	6.74	6.31	5.91	5.57	5.24	4.96	4.69	4.45	4.23	4.02	3.83	40 0
30 30	7.65	7.10	6.62	6.20	5.81	5.47	5.15	4.87	4.61	4.37	4.15	3.95	30 30
41 0	8.14	7.52	6.98	6.50	6.09	5.71	5.37	5.06	4.78	4.52	4.29	4.07	41 0
30 30	8.69	8.00	7.39	6.86	6.39	5.98	5.61	5.27	4.97	4.69	4.44	4.21	30 30
42 0	9.34	8.53	7.85	7.26	6.74	6.27	5.87	5.50	5.17	4.87	4.60	4.35	42 0
30 30	10.10	9.17	8.38	7.71	7.13	6.61	6.15	5.76	5.40	5.07	4.78	4.51	30 30
43 0	11.02	9.92	9.01	8.23	7.57	7.00	6.49	6.03	5.65	5.30	4.98	4.69	43 0
30 30	12.14	10.82	9.74	8.85	8.08	7.43	6.87	6.37	5.92	5.54	5.20	4.87	30 30
44 0	13.55	11.92	10.63	9.56	8.69	7.93	7.29	6.74	6.25	5.81	5.44	5.10	44 0
30 30	15.35	13.30	11.71	10.44	9.39	8.52	7.78	7.15	6.61	6.13	5.70	5.32	30 30
45 0	17.75	15.07	13.06	11.49	10.24	9.21	8.35	7.63	7.01	6.47	6.00	5.59	45 0
30 30		17.42	14.79	12.81	11.27	10.04	9.03	8.19	7.48	6.87	6.34	5.88	30 30
46 0			17.10	14.51	12.57	11.06	9.85	8.86	8.03	7.34	6.74	6.22	46 0
30 30				16.77	14.23	12.32	10.84	9.65	8.68	7.87	7.19	6.60	30 30
47 0					16.45	13.95	12.08	10.62	9.46	8.50	7.71	7.04	47 0
30 30						16.12	13.68	11.84	10.41	9.26	8.33	7.55	30 30
48 0							15.80	13.40	11.60	10.19	9.07	8.15	48 0
30 30								15.47	13.12	11.35	9.98	8.88	30 30
49 0									15.15	12.85	11.11	9.77	49 0
30 30										14.83	12.57	10.87	30 30
50 0											14.51	12.30	50 0
30 30												14.20	30 30
51 0	15.80												51 0
30 30	13.40	15.47											30 30
52 0	11.60	13.12	15.15										52 0
30 30	10.19	11.35	12.85	14.83									30 30
53 0	9.07	9.98	11.11	12.57	14.51								53 0
30 30	8.15	8.88	9.77	10.87	12.30	14.20							30 30
54 0	7.39	7.98	8.69	9.55	10.64	12.03	13.88						54 0
30 30	6.74	7.23	7.81	8.50	9.34	10.40	11.71	13.56					30 30
55 0	6.18	6.59	7.07	7.63	8.31	9.13	10.16	11.49	13.25				55 0
30 30	5.70	6.04	6.45	6.91	7.46	8.12	8.92	9.92	11.22	12.94			30 30
56 0	5.28	5.57	5.91	6.30	6.75	7.29	7.93	8.71	9.69	10.95	12.63		56 0
30 30	4.90	5.16	5.45	5.77	6.15	6.59	7.12	7.74	8.50	9.46	10.68	12.32	30 30
57 0	4.57	4.79	5.04	5.32	5.64	6.01	6.44	6.95	7.55	8.30	9.23	10.42	57 0
30 30	4.28	4.46	4.68	4.92	5.19	5.50	5.86	6.28	6.78	7.37	8.19	9.00	30 30
58 0	4.01	4.18	4.36	4.57	4.81	5.07	5.37	5.72	6.13	6.61	7.19	7.89	58 0
30 30	3.77	3.91	4.08	4.26	4.46	4.69	4.88	5.24	5.58	5.97	6.44	7.00	30 30
59 0	3.55	3.68	3.82	3.98	4.16	4.36	4.57	4.79	5.11	5.44	5.88	6.27	59 0
30 30	3.35	3.46	3.59	3.72	3.88	4.06	4.25	4.46	4.70	4.98	5.30	5.70	30 30
60 0	3.16	3.27	3.38	3.50	3.63	3.78	3.96	4.14	4.34	4.58	4.85	5.16	60 0

Altitude above 87°

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>same Name as</i> —LATITUDE.												Latitude.
	54 0	54 30	55 0	55 30	56 0	56 30	57 0	57 30	58 0	58 30	59 0	59 30	
0 0	1.43	1.40	1.37	1.34	1.32	1.30	1.28	1.25	1.23	1.20	1.18	1.15	0 0
30	1.43	1.40	1.38	1.35	1.33	1.30	1.28	1.25	1.23	1.20	1.18	1.16	30
1 0	1.44	1.41	1.39	1.36	1.34	1.31	1.29	1.26	1.24	1.21	1.19	1.17	1 0
30	1.45	1.42	1.40	1.37	1.35	1.32	1.29	1.26	1.24	1.22	1.20	1.17	30
2 0	1.46	1.43	1.41	1.38	1.36	1.33	1.30	1.27	1.25	1.23	1.21	1.18	2 0
30	1.47	1.44	1.42	1.39	1.36	1.33	1.31	1.28	1.26	1.23	1.21	1.18	30
3 0	1.48	1.45	1.43	1.40	1.37	1.34	1.32	1.29	1.27	1.24	1.22	1.19	3 0
30	1.49	1.46	1.44	1.41	1.38	1.35	1.33	1.30	1.27	1.25	1.22	1.20	30
4 0	1.50	1.47	1.45	1.42	1.39	1.36	1.34	1.31	1.28	1.25	1.23	1.20	4 0
30	1.51	1.48	1.45	1.43	1.40	1.37	1.34	1.32	1.29	1.26	1.24	1.21	30
5 0	1.52	1.49	1.46	1.43	1.41	1.38	1.35	1.32	1.30	1.27	1.25	1.22	5 0
30	1.53	1.50	1.47	1.44	1.42	1.39	1.36	1.33	1.30	1.28	1.25	1.23	30
6 0	1.54	1.51	1.48	1.45	1.43	1.40	1.37	1.34	1.31	1.28	1.26	1.23	6 0
30	1.55	1.52	1.49	1.46	1.43	1.41	1.38	1.35	1.32	1.29	1.26	1.24	30
7 0	1.57	1.53	1.50	1.47	1.44	1.41	1.39	1.36	1.33	1.30	1.27	1.24	7 0
30	1.58	1.54	1.51	1.48	1.45	1.42	1.39	1.37	1.34	1.31	1.28	1.25	30
8 0	1.59	1.55	1.52	1.49	1.46	1.43	1.40	1.37	1.35	1.32	1.29	1.26	8 0
30	1.60	1.57	1.53	1.50	1.47	1.44	1.41	1.38	1.35	1.32	1.29	1.27	30
9 0	1.61	1.58	1.55	1.51	1.48	1.45	1.42	1.39	1.36	1.33	1.30	1.27	9 0
30	1.62	1.59	1.56	1.52	1.49	1.46	1.43	1.40	1.37	1.34	1.31	1.28	30
10 0	1.64	1.60	1.57	1.53	1.50	1.47	1.44	1.41	1.38	1.35	1.32	1.29	10 0
30	1.65	1.61	1.58	1.54	1.51	1.48	1.45	1.42	1.39	1.36	1.33	1.30	30
11 0	1.66	1.62	1.59	1.55	1.52	1.49	1.46	1.43	1.40	1.37	1.34	1.31	11 0
30	1.67	1.64	1.60	1.57	1.53	1.50	1.47	1.44	1.40	1.37	1.34	1.31	30
12 0	1.69	1.65	1.62	1.58	1.55	1.51	1.48	1.44	1.41	1.38	1.35	1.32	12 0
30	1.70	1.66	1.63	1.59	1.56	1.52	1.49	1.45	1.42	1.39	1.36	1.33	30
13 0	1.71	1.67	1.64	1.60	1.57	1.53	1.50	1.46	1.43	1.40	1.37	1.34	13 0
30	1.72	1.69	1.65	1.61	1.58	1.54	1.51	1.47	1.44	1.41	1.38	1.34	30
14 0	1.74	1.70	1.67	1.63	1.59	1.55	1.52	1.48	1.45	1.42	1.39	1.35	14 0
30	1.75	1.71	1.68	1.64	1.60	1.57	1.53	1.49	1.46	1.43	1.40	1.36	30
15 0	1.77	1.73	1.69	1.65	1.62	1.58	1.54	1.50	1.47	1.44	1.41	1.37	15 0
30	1.78	1.74	1.70	1.66	1.63	1.59	1.55	1.51	1.48	1.45	1.42	1.38	30
16 0	1.80	1.76	1.72	1.68	1.64	1.60	1.57	1.53	1.49	1.46	1.43	1.39	16 0
30	1.81	1.77	1.73	1.69	1.65	1.61	1.58	1.54	1.50	1.47	1.44	1.40	30
17 0	1.83	1.79	1.75	1.71	1.67	1.63	1.59	1.55	1.52	1.48	1.45	1.41	17 0
30	1.85	1.80	1.76	1.72	1.68	1.64	1.60	1.56	1.53	1.49	1.46	1.42	30
18 0	1.87	1.82	1.78	1.74	1.70	1.66	1.62	1.58	1.54	1.50	1.47	1.43	18 0
30	1.88	1.84	1.79	1.75	1.71	1.67	1.63	1.59	1.55	1.51	1.48	1.44	30
19 0	1.90	1.85	1.81	1.77	1.73	1.68	1.64	1.60	1.56	1.52	1.49	1.45	19 0
30	1.92	1.87	1.83	1.78	1.74	1.70	1.65	1.62	1.58	1.54	1.50	1.46	30
20 0	1.94	1.89	1.85	1.80	1.76	1.71	1.67	1.63	1.59	1.55	1.51	1.47	20 0
30	1.96	1.91	1.86	1.82	1.77	1.73	1.68	1.64	1.60	1.56	1.52	1.48	30
21 0	1.98	1.93	1.88	1.83	1.79	1.74	1.70	1.65	1.61	1.57	1.53	1.49	21 0
30	2.00	1.95	1.90	1.85	1.80	1.76	1.71	1.67	1.62	1.58	1.54	1.50	30
22 0	2.02	1.97	1.92	1.87	1.82	1.77	1.73	1.68	1.64	1.60	1.56	1.52	22 0
30	2.04	1.99	1.94	1.89	1.84	1.79	1.74	1.70	1.65	1.61	1.57	1.53	30
23 0	2.06	2.01	1.96	1.91	1.86	1.81	1.76	1.71	1.67	1.62	1.58	1.54	23 0
30	2.08	2.03	1.98	1.92	1.87	1.82	1.77	1.73	1.68	1.64	1.59	1.55	30
24 0	2.11	2.05	2.00	1.94	1.89	1.84	1.79	1.74	1.70	1.65	1.61	1.57	24 0
30	2.13	2.07	2.01	1.96	1.91	1.85	1.80	1.76	1.71	1.66	1.62	1.58	30
25 0	2.16	2.09	2.03	1.98	1.93	1.87	1.82	1.77	1.73	1.68	1.63	1.59	25 0
30	2.18	2.12	2.06	1.99	1.95	1.90	1.84	1.79	1.74	1.70	1.65	1.60	30
26 0	2.21	2.15	2.09	2.03	1.97	1.92	1.87	1.81	1.76	1.71	1.67	1.62	26 0
30	2.24	2.17	2.11	2.05	1.99	1.94	1.89	1.83	1.78	1.73	1.68	1.64	30
27 0	2.27	2.20	2.14	2.08	2.02	1.96	1.91	1.85	1.80	1.75	1.70	1.65	27 0
30	2.29	2.23	2.16	2.10	2.04	1.98	1.93	1.87	1.82	1.76	1.71	1.67	30
28 0	2.32	2.25	2.19	2.12	2.06	2.00	1.95	1.89	1.84	1.78	1.73	1.68	28 0
30	2.35	2.28	2.22	2.15	2.08	2.02	1.97	1.91	1.86	1.80	1.75	1.70	30
29 0	2.39	2.32	2.25	2.18	2.11	2.05	1.99	1.93	1.88	1.82	1.77	1.72	29 0
30	2.42	2.35	2.28	2.21	2.14	2.07	2.01	1.95	1.90	1.84	1.79	1.73	30
30 0	2.46	2.38	2.31	2.24	2.17	2.10	2.04	1.98	1.92	1.86	1.81	1.75	30 0

TABLE III.—VALUES OF C.

Latitude.		DECLINATION—same Name as—LATITUDE.												Latitude.	
		54 °	54 30	55 °	55 30	56 °	56 30	57 °	57 30	58 °	58 30	59 °	59 30		
30	°	2.46	2.38	2.31	2.24	2.17	2.10	2.04	1.98	1.92	1.86	1.81	1.75	30	°
30	30	2.49	2.41	2.34	2.27	2.20	2.13	2.06	2.00	1.94	1.88	1.83	1.77	30	30
31	°	2.53	2.45	2.37	2.30	2.23	2.16	2.09	2.02	1.96	1.90	1.85	1.79	31	°
30	30	2.56	2.48	2.40	2.33	2.26	2.19	2.12	2.05	1.98	1.92	1.87	1.81	30	30
32	°	2.61	2.52	2.44	2.36	2.29	2.22	2.15	2.08	2.01	1.95	1.89	1.83	32	°
30	30	2.65	2.56	2.48	2.40	2.32	2.25	2.17	2.10	2.03	1.97	1.91	1.85	30	30
33	°	2.70	2.61	2.52	2.44	2.36	2.28	2.21	2.13	2.06	1.99	1.93	1.87	33	°
30	30	2.75	2.65	2.56	2.47	2.39	2.31	2.23	2.16	2.09	2.02	1.95	1.89	30	30
34	°	2.79	2.70	2.60	2.51	2.43	2.35	2.27	2.19	2.12	2.05	1.98	1.92	34	°
30	30	2.85	2.75	2.65	2.55	2.46	2.38	2.30	2.22	2.15	2.08	2.01	1.94	30	30
35	°	2.90	2.80	2.70	2.60	2.51	2.42	2.34	2.26	2.18	2.11	2.04	1.97	35	°
30	30	2.95	2.84	2.74	2.65	2.55	2.46	2.37	2.29	2.21	2.13	2.06	1.99	30	30
36	°	3.02	2.90	2.79	2.69	2.60	2.50	2.41	2.33	2.25	2.17	2.09	2.02	36	°
30	30	3.08	2.96	2.85	2.74	2.64	2.55	2.45	2.36	2.28	2.20	2.12	2.04	30	30
37	°	3.15	3.03	2.91	2.80	2.69	2.59	2.50	2.41	2.32	2.24	2.16	2.08	37	°
30	30	3.22	3.09	2.97	2.85	2.74	2.64	2.54	2.45	2.36	2.27	2.19	2.11	30	30
38	°	3.30	3.17	3.04	2.92	2.80	2.69	2.59	2.49	2.40	2.31	2.22	2.14	38	°
30	30	3.38	3.24	3.11	2.98	2.86	2.74	2.63	2.53	2.44	2.35	2.26	2.17	30	30
39	°	3.47	3.32	3.18	3.05	2.92	2.80	2.69	2.58	2.48	2.39	2.30	2.21	39	°
30	30	3.56	3.40	3.25	3.11	2.98	2.86	2.74	2.63	2.52	2.43	2.34	2.25	30	30
40	°	3.65	3.49	3.33	3.19	3.05	2.92	2.80	2.69	2.58	2.47	2.38	2.29	40	°
30	30	3.70	3.58	3.42	3.27	3.12	2.99	2.86	2.74	2.63	2.52	2.42	2.33	30	30
41	°	3.87	3.68	3.51	3.35	3.20	3.06	2.93	2.80	2.68	2.58	2.47	2.37	41	°
30	30	3.99	3.80	3.61	3.44	3.28	3.14	3.00	2.87	2.74	2.63	2.53	2.42	30	30
42	°	4.12	3.91	3.72	3.53	3.37	3.21	3.07	2.93	2.80	2.69	2.58	2.47	42	°
30	30	4.26	4.04	3.83	3.64	3.40	3.30	3.14	3.00	2.87	2.74	2.63	2.52	30	30
43	°	4.42	4.18	3.96	3.75	3.57	3.39	3.23	3.08	2.94	2.81	2.68	2.57	43	°
30	30	4.59	4.34	4.09	3.88	3.67	3.49	3.32	3.16	3.01	2.87	2.74	2.62	30	30
44	°	4.78	4.50	4.25	4.01	3.80	3.59	3.42	3.25	3.09	2.94	2.81	2.68	44	°
30	30	4.99	4.68	4.41	4.16	3.93	3.72	3.52	3.34	3.18	3.02	2.88	2.75	30	30
45	°	5.22	4.88	4.59	4.31	4.07	3.84	3.64	3.45	3.27	3.11	2.96	2.81	45	°
30	30	5.47	5.11	4.78	4.49	4.22	3.97	3.76	3.56	3.37	3.19	3.03	2.89	30	30
46	°	5.76	5.36	5.00	4.68	4.39	4.13	3.89	3.68	3.48	3.29	3.12	2.96	46	°
30	30	6.09	5.64	5.24	4.89	4.58	4.29	4.04	3.80	3.59	3.40	3.21	3.05	30	30
47	°	6.46	5.96	5.52	5.13	4.79	4.48	4.20	3.95	3.72	3.51	3.32	3.14	47	°
30	30	6.89	6.32	5.83	5.40	5.02	4.68	4.38	4.10	3.86	3.63	3.43	3.24	30	30
48	°	7.39	6.74	6.18	5.70	5.28	4.90	4.57	4.28	4.01	3.77	3.55	3.35	48	°
30	30	7.98	7.23	6.59	6.04	5.57	5.16	4.79	4.46	4.18	3.91	3.68	3.46	30	30
49	°	8.69	7.81	7.07	6.45	5.91	5.45	5.04	4.68	4.36	4.08	3.82	3.59	49	°
30	30	9.55	8.50	7.63	6.91	6.30	5.77	5.32	4.92	4.57	4.26	3.98	3.72	30	30
50	°	10.64	9.34	8.31	7.46	6.75	6.15	5.64	5.19	4.81	4.46	4.16	3.88	50	°
30	30	12.03	10.40	9.13	8.12	7.29	6.59	6.01	5.50	5.07	4.69	4.36	4.06	30	30
51	°	13.88	11.71	10.16	8.92	7.93	7.12	6.44	5.86	5.37	4.88	4.57	4.25	51	°
30	30		13.56	11.49	9.92	8.71	7.74	6.95	6.28	5.72	5.24	4.79	4.46	30	30
52	°			13.25	11.22	9.69	8.50	7.55	6.78	6.13	5.58	5.11	4.70	52	°
30	30				12.94	10.95	9.46	8.30	7.37	6.61	5.97	5.44	4.98	30	30
53	°					12.63	10.68	9.23	8.19	7.19	6.44	5.88	5.30	53	°
30	30						12.32	10.42	9.00	7.89	7.00	6.27	5.70	30	30
54	°							12.01	10.16	8.77	7.69	6.82	6.11	54	°
30	30								11.70	9.90	8.54	7.48	6.64	30	30
55	°									11.40	9.64	8.31	7.28	55	°
30	30										11.10	9.38	8.09	30	30
56	°													56	°
30	30													30	30
57	°	12.01												57	°
30	30	10.16	11.70											30	30
58	°	8.77	9.90	11.40										58	°
30	30	7.69	8.54	9.64	11.10									30	30
59	°	6.82	7.48	8.31	9.38	10.81								59	°
30	30	6.11	6.64	7.28	8.09	9.13	10.51							30	30
60	°	5.52	5.95	6.46	7.09	7.87	8.88	10.22						60	°

Altitude above 87°

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	60 0	60 30	61 0	62 0	63 0	64 0	65 0	66 0	67 0	68 0	69 0	70 0	
0 0	1.13	1.11	1.09	1.04	1.00	0.96	0.91	0.87	0.83	0.79	0.75	0.71	0 0
30	1.14	1.12	1.09	1.04	1.00	0.96	0.92	0.87	0.83	0.79	0.75	0.71	30
1 0	1.15	1.13	1.10	1.05	1.01	0.97	0.92	0.88	0.84	0.80	0.76	0.72	1 0
30	1.15	1.13	1.10	1.05	1.01	0.97	0.93	0.88	0.84	0.80	0.76	0.72	30
2 0	1.16	1.13	1.11	1.06	1.02	0.97	0.93	0.89	0.84	0.80	0.76	0.72	2 0
30	1.16	1.14	1.11	1.06	1.02	0.97	0.93	0.89	0.85	0.80	0.76	0.72	30
3 0	1.17	1.14	1.12	1.07	1.03	0.98	0.93	0.89	0.85	0.81	0.77	0.73	3 0
30	1.17	1.15	1.12	1.07	1.03	0.98	0.94	0.89	0.85	0.81	0.77	0.73	30
4 0	1.18	1.15	1.13	1.08	1.04	0.99	0.94	0.90	0.86	0.82	0.77	0.73	4 0
30	1.18	1.16	1.13	1.08	1.04	0.99	0.95	0.90	0.86	0.82	0.77	0.73	30
5 0	1.19	1.16	1.14	1.09	1.05	1.00	0.95	0.91	0.86	0.82	0.78	0.74	5 0
30	1.20	1.17	1.15	1.10	1.05	1.00	0.96	0.91	0.87	0.82	0.78	0.74	30
6 0	1.21	1.18	1.16	1.11	1.06	1.01	0.96	0.92	0.87	0.83	0.79	0.74	6 0
30	1.21	1.19	1.16	1.11	1.06	1.01	0.97	0.92	0.87	0.83	0.79	0.74	30
7 0	1.22	1.19	1.17	1.12	1.07	1.02	0.97	0.92	0.87	0.83	0.79	0.75	7 0
30	1.22	1.20	1.17	1.12	1.07	1.02	0.97	0.92	0.88	0.83	0.79	0.75	30
8 0	1.23	1.20	1.18	1.13	1.08	1.03	0.98	0.93	0.88	0.84	0.80	0.75	8 0
30	1.24	1.21	1.18	1.13	1.08	1.03	0.98	0.93	0.89	0.84	0.80	0.75	30
9 0	1.25	1.22	1.19	1.14	1.09	1.04	0.99	0.94	0.89	0.85	0.80	0.76	9 0
30	1.25	1.23	1.20	1.14	1.09	1.04	0.99	0.94	0.89	0.85	0.80	0.76	30
10 0	1.26	1.23	1.21	1.15	1.10	1.05	1.00	0.95	0.90	0.85	0.81	0.76	10 0
30	1.27	1.24	1.21	1.15	1.10	1.05	1.00	0.95	0.90	0.85	0.81	0.76	30
11 0	1.28	1.24	1.22	1.16	1.11	1.06	1.01	0.96	0.91	0.86	0.81	0.77	11 0
30	1.28	1.25	1.22	1.17	1.11	1.06	1.01	0.96	0.91	0.86	0.81	0.77	30
12 0	1.29	1.26	1.23	1.18	1.12	1.07	1.01	0.96	0.91	0.87	0.82	0.77	12 0
30	1.30	1.27	1.24	1.18	1.12	1.07	1.02	0.96	0.92	0.87	0.82	0.77	30
13 0	1.31	1.28	1.25	1.19	1.13	1.08	1.02	0.97	0.92	0.87	0.83	0.78	13 0
30	1.31	1.28	1.25	1.19	1.14	1.08	1.03	0.97	0.92	0.87	0.83	0.78	30
14 0	1.32	1.29	1.26	1.20	1.15	1.09	1.03	0.98	0.93	0.88	0.83	0.79	14 0
30	1.33	1.30	1.27	1.21	1.15	1.09	1.04	0.98	0.93	0.88	0.83	0.79	30
15 0	1.34	1.31	1.28	1.22	1.16	1.10	1.04	0.99	0.94	0.89	0.84	0.79	15 0
30	1.35	1.32	1.28	1.22	1.16	1.10	1.05	0.99	0.94	0.89	0.84	0.79	30
16 0	1.36	1.32	1.29	1.23	1.17	1.11	1.05	1.00	0.95	0.90	0.85	0.80	16 0
30	1.37	1.33	1.30	1.24	1.18	1.11	1.06	1.00	0.95	0.90	0.85	0.80	30
17 0	1.38	1.34	1.31	1.25	1.19	1.12	1.06	1.01	0.96	0.91	0.85	0.80	17 0
30	1.39	1.35	1.32	1.25	1.19	1.13	1.07	1.01	0.96	0.91	0.85	0.80	30
18 0	1.40	1.36	1.33	1.26	1.20	1.14	1.08	1.02	0.96	0.91	0.86	0.81	18 0
30	1.41	1.37	1.34	1.27	1.20	1.14	1.08	1.02	0.97	0.91	0.86	0.81	30
19 0	1.42	1.38	1.35	1.28	1.21	1.15	1.09	1.03	0.97	0.92	0.87	0.82	19 0
30	1.43	1.39	1.35	1.28	1.22	1.15	1.09	1.03	0.98	0.92	0.87	0.82	30
20 0	1.44	1.40	1.36	1.29	1.23	1.16	1.10	1.04	0.98	0.93	0.88	0.82	20 0
30	1.45	1.41	1.37	1.30	1.23	1.17	1.11	1.04	0.99	0.93	0.88	0.82	30
21 0	1.46	1.42	1.38	1.31	1.24	1.18	1.11	1.05	0.99	0.94	0.88	0.83	21 0
30	1.47	1.43	1.39	1.32	1.25	1.18	1.12	1.06	1.00	0.94	0.88	0.83	30
22 0	1.48	1.44	1.40	1.33	1.26	1.19	1.13	1.07	1.01	0.95	0.89	0.84	22 0
30	1.49	1.45	1.41	1.34	1.27	1.20	1.14	1.07	1.01	0.95	0.89	0.84	30
23 0	1.50	1.46	1.42	1.35	1.28	1.21	1.14	1.08	1.02	0.96	0.90	0.84	23 0
30	1.51	1.47	1.43	1.36	1.28	1.21	1.15	1.08	1.02	0.96	0.90	0.84	30
24 0	1.53	1.48	1.45	1.37	1.29	1.22	1.15	1.09	1.02	0.96	0.91	0.85	24 0
30	1.54	1.50	1.45	1.38	1.30	1.23	1.16	1.09	1.03	0.96	0.91	0.85	30
25 0	1.55	1.50	1.46	1.39	1.31	1.24	1.17	1.10	1.03	0.97	0.92	0.86	25 0
30	1.56	1.52	1.47	1.40	1.32	1.25	1.18	1.11	1.04	0.97	0.92	0.86	30
26 0	1.58	1.53	1.49	1.41	1.33	1.26	1.19	1.12	1.05	0.98	0.93	0.87	26 0
30	1.59	1.55	1.50	1.42	1.34	1.26	1.19	1.12	1.06	0.99	0.93	0.87	30
27 0	1.61	1.56	1.52	1.43	1.35	1.27	1.20	1.13	1.06	1.00	0.94	0.88	27 0
30	1.62	1.58	1.53	1.44	1.36	1.28	1.21	1.13	1.07	1.00	0.94	0.88	30
28 0	1.64	1.59	1.54	1.46	1.37	1.29	1.21	1.14	1.07	1.01	0.95	0.89	28 0
30	1.65	1.60	1.55	1.47	1.38	1.30	1.22	1.15	1.08	1.01	0.95	0.89	30
29 0	1.67	1.60	1.57	1.48	1.39	1.31	1.23	1.16	1.09	1.02	0.96	0.89	29 0
30	1.68	1.63	1.58	1.49	1.40	1.32	1.24	1.17	1.10	1.02	0.96	0.89	30
30 0	1.70	1.65	1.60	1.51	1.42	1.33	1.25	1.18	1.11	1.03	0.97	0.90	30 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION—same Name as—LATITUDE.												Latitude.
	60° 0'	60° 30'	61° 0'	62° 0'	63° 0'	64° 0'	65° 0'	66° 0'	67° 0'	68° 0'	69° 0'	70° 0'	
30° 0'	1.70	1.65	1.60	1.51	1.42	1.33	1.25	1.18	1.11	1.03	0.97	0.90	30° 0'
30 30	1.72	1.66	1.61	1.52	1.43	1.34	1.26	1.18	1.11	1.04	0.97	0.90	30 30
31 0	1.74	1.68	1.63	1.53	1.44	1.35	1.27	1.19	1.12	1.05	0.98	0.91	31 0
30 30	1.75	1.70	1.65	1.54	1.45	1.36	1.28	1.20	1.13	1.05	0.98	0.91	30 30
32 0	1.77	1.72	1.67	1.56	1.47	1.38	1.29	1.21	1.13	1.06	0.99	0.92	32 0
30 30	1.79	1.73	1.68	1.57	1.48	1.39	1.30	1.22	1.14	1.07	1.00	0.92	30 30
33 0	1.81	1.75	1.70	1.59	1.50	1.40	1.31	1.23	1.15	1.08	1.01	0.93	33 0
30 30	1.83	1.77	1.72	1.61	1.51	1.41	1.32	1.24	1.16	1.08	1.01	0.94	30 30
34 0	1.86	1.79	1.74	1.63	1.52	1.43	1.33	1.25	1.17	1.09	1.02	0.95	34 0
30 30	1.88	1.82	1.76	1.64	1.54	1.44	1.34	1.26	1.18	1.10	1.02	0.95	30 30
35 0	1.90	1.84	1.78	1.66	1.56	1.45	1.35	1.27	1.18	1.11	1.03	0.96	35 0
30 30	1.92	1.86	1.80	1.68	1.57	1.46	1.37	1.28	1.19	1.11	1.04	0.96	30 30
36 0	1.95	1.88	1.82	1.70	1.59	1.48	1.38	1.29	1.20	1.12	1.05	0.97	36 0
30 30	1.97	1.91	1.84	1.72	1.60	1.49	1.39	1.30	1.21	1.13	1.05	0.97	30 30
37 0	2.00	1.94	1.87	1.74	1.62	1.51	1.40	1.31	1.22	1.14	1.06	0.98	37 0
30 30	2.04	1.96	1.89	1.76	1.64	1.53	1.42	1.32	1.23	1.14	1.07	0.99	30 30
38 0	2.07	1.99	1.92	1.79	1.66	1.55	1.43	1.34	1.24	1.15	1.08	1.00	38 0
30 30	2.10	2.02	1.94	1.81	1.68	1.56	1.45	1.35	1.25	1.16	1.08	1.00	30 30
39 0	2.13	2.05	1.97	1.83	1.70	1.58	1.47	1.37	1.26	1.17	1.09	1.01	39 0
30 30	2.16	2.08	2.00	1.86	1.72	1.60	1.49	1.38	1.28	1.18	1.10	1.02	30 30
40 0	2.20	2.12	2.03	1.89	1.75	1.62	1.50	1.40	1.29	1.20	1.11	1.03	40 0
30 30	2.24	2.15	2.06	1.91	1.78	1.64	1.52	1.41	1.31	1.21	1.12	1.03	30 30
41 0	2.28	2.18	2.10	1.94	1.80	1.66	1.54	1.43	1.32	1.22	1.13	1.04	41 0
30 30	2.32	2.22	2.13	1.97	1.82	1.68	1.56	1.44	1.34	1.23	1.14	1.05	30 30
42 0	2.36	2.26	2.17	2.00	1.85	1.71	1.58	1.46	1.35	1.25	1.15	1.06	42 0
30 30	2.41	2.30	2.21	2.03	1.88	1.73	1.60	1.47	1.36	1.26	1.16	1.07	30 30
43 0	2.46	2.35	2.25	2.07	1.91	1.76	1.62	1.49	1.37	1.27	1.17	1.08	43 0
30 30	2.51	2.40	2.29	2.11	1.94	1.78	1.64	1.51	1.39	1.28	1.18	1.09	30 30
44 0	2.56	2.45	2.34	2.15	1.97	1.81	1.66	1.53	1.41	1.30	1.20	1.10	44 0
30 30	2.62	2.50	2.39	2.19	2.00	1.84	1.69	1.55	1.43	1.31	1.21	1.11	30 30
45 0	2.68	2.56	2.44	2.23	2.04	1.87	1.71	1.57	1.45	1.33	1.22	1.12	45 0
30 30	2.75	2.62	2.50	2.27	2.08	1.90	1.74	1.59	1.47	1.34	1.23	1.13	30 30
46 0	2.82	2.68	2.56	2.32	2.12	1.93	1.77	1.62	1.49	1.36	1.25	1.15	46 0
30 30	2.90	2.75	2.62	2.37	2.16	1.97	1.80	1.64	1.52	1.37	1.26	1.16	30 30
47 0	2.98	2.82	2.68	2.43	2.21	2.01	1.83	1.67	1.54	1.40	1.28	1.17	47 0
30 30	3.07	2.90	2.75	2.49	2.25	2.05	1.87	1.70	1.56	1.42	1.29	1.18	30 30
48 0	3.16	2.99	2.83	2.55	2.30	2.09	1.90	1.73	1.58	1.44	1.31	1.20	48 0
30 30	3.27	3.08	2.91	2.62	2.36	2.13	1.94	1.76	1.60	1.46	1.33	1.21	30 30
49 0	3.38	3.18	3.00	2.69	2.42	2.18	1.97	1.79	1.63	1.48	1.35	1.23	49 0
30 30	3.50	3.29	3.10	2.77	2.48	2.23	2.01	1.82	1.66	1.50	1.37	1.24	30 30
50 0	3.63	3.41	3.21	2.85	2.55	2.29	2.06	1.86	1.69	1.53	1.39	1.26	50 0
30 30	3.78	3.54	3.32	2.94	2.62	2.34	2.11	1.90	1.72	1.55	1.41	1.28	30 30
51 0	3.96	3.68	3.45	3.04	2.70	2.41	2.16	1.94	1.75	1.58	1.43	1.30	51 0
30 30	4.14	3.85	3.59	3.15	2.79	2.48	2.21	1.98	1.79	1.61	1.45	1.32	30 30
52 0	4.34	4.03	3.75	3.27	2.88	2.55	2.26	2.03	1.82	1.64	1.48	1.34	52 0
30 30	4.58	4.23	3.92	3.40	2.98	2.63	2.33	2.08	1.86	1.67	1.51	1.36	30 30
53 0	4.85	4.46	4.12	3.55	3.09	2.72	2.40	2.14	1.91	1.71	1.54	1.38	53 0
30 30	5.16	4.72	4.34	3.71	3.21	2.81	2.48	2.19	1.95	1.75	1.57	1.40	30 30
54 0	5.52	5.02	4.59	3.89	3.35	2.91	2.56	2.26	2.00	1.79	1.60	1.43	54 0
30 30	5.95	5.38	4.88	4.10	3.50	3.03	2.64	2.33	2.06	1.83	1.63	1.46	30 30
55 0	6.46	5.78	5.25	4.34	3.67	3.16	2.74	2.40	2.12	1.88	1.67	1.49	55 0
30 30	7.09	6.28	5.62	4.61	3.87	3.30	2.85	2.48	2.18	1.93	1.71	1.52	30 30
56 0	7.87	6.89	6.11	4.98	4.09	3.46	2.97	2.57	2.25	1.98	1.75	1.55	56 0
30 30	8.88	7.65	6.70	5.31	4.35	3.64	3.10	2.67	2.32	2.04	1.79	1.59	30 30
57 0	10.22	8.63	7.43	5.76	4.69	3.85	3.25	2.78	2.41	2.10	1.84	1.63	57 0
30 30		9.93	8.38	6.31	5.00	4.08	3.42	2.90	2.50	2.17	1.88	1.67	30 30
58 0			9.64	7.00	5.42	4.36	3.61	3.04	2.60	2.24	1.95	1.71	58 0
30 30				7.89	5.94	4.69	3.83	3.20	2.71	2.33	2.02	1.76	30 30
59 0				9.07	6.58	5.09	4.09	3.37	2.84	2.42	2.09	1.81	59 0
30 30					7.41	5.57	4.39	3.58	2.98	2.53	2.17	1.87	30 30
60 0					8.52	6.17	4.76	3.82	3.15	2.64	2.25	1.93	60 0

Altitude above 87°

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to</i> —LATITUDE.														Latitude.
	0 0	0 30	1 0	1 30	2 0	2 30	3 0	3 30	4 0	4 30	5 0	5 30			
0 0	"	"	"	"	"	"	"	37.47	32.10	28.08	24.95	22.44	20.39	0 0	
0 30								32.12	28.09	24.97	22.46	20.41	18.70	0 30	
1 0	Altitude	above	87°					32.13	28.10	24.98	22.47	20.42	18.71	1 0	
1 30				37.49	37.49	32.13	28.11	24.99	22.48	20.44	18.72	17.27	16.03	1 30	
2 0			37.49	32.13	28.11	24.99	22.48	20.44	18.74	17.28	16.04	14.96	2 0		
2 30		37.48	32.13	28.11	24.99	22.48	20.44	18.74	17.29	16.05	14.97	14.03	2 30		
3 0	37.47	32.12	28.10	24.99	22.48	20.44	18.74	17.29	16.05	14.98	14.04	13.20	3 0		
3 30	32.10	28.09	24.98	22.48	20.44	18.74	17.29	16.05	14.98	14.04	13.21	12.47	3 30		
4 0	28.08	24.97	22.47	20.43	18.73	17.29	16.05	14.98	14.04	13.21	12.47	11.81	4 0		
4 30	24.95	22.46	20.42	18.72	17.28	16.05	14.98	14.04	13.21	12.47	11.81	11.22	4 30		
5 0	22.44	20.41	18.71	17.27	16.04	14.97	14.04	13.21	12.47	11.81	11.22	10.68	5 0		
5 30	20.39	18.70	17.26	16.03	14.96	14.03	13.20	12.47	11.81	11.22	10.68	10.20	5 30		
6 0	18.68	17.25	16.02	14.95	14.02	13.20	12.47	11.81	11.22	10.68	10.20	9.75	6 0		
6 30	17.23	16.01	14.94	14.01	13.19	12.46	11.81	11.22	10.68	10.20	9.75	9.36	6 30		
7 0	15.99	14.93	14.00	13.18	12.45	11.80	11.21	10.67	10.19	9.75	9.34	8.96	7 0		
7 30	14.92	13.99	13.17	12.44	11.79	11.20	10.67	10.19	9.74	9.34	8.96	8.62	7 30		
8 0	13.97	13.16	12.43	11.78	11.19	10.66	10.18	9.74	9.33	8.95	8.61	8.29	8 0		
8 30	13.14	12.42	11.77	11.18	10.65	10.17	9.73	9.32	8.95	8.61	8.29	7.99	8 30		
9 0	12.40	11.75	11.17	10.64	10.16	9.72	9.31	8.94	8.60	8.29	7.99	7.71	9 0		
9 30	11.73	11.16	10.63	10.15	9.71	9.30	8.94	8.59	8.28	7.98	7.71	7.45	9 30		
10 0	11.14	10.62	10.13	9.70	9.29	8.93	8.58	8.27	7.97	7.70	7.44	7.20	10 0		
10 30	10.60	10.12	9.68	9.28	8.92	8.57	8.26	7.97	7.69	7.44	7.20	6.98	10 30		
11 0	10.10	9.67	9.27	8.91	8.56	8.25	7.96	7.68	7.43	7.19	6.97	6.76	11 0		
11 30	9.65	9.26	8.89	8.55	8.24	7.95	7.67	7.42	7.18	6.96	6.75	6.55	11 30		
12 0	9.24	8.88	8.54	8.23	7.93	7.66	7.41	7.17	6.95	6.74	6.54	6.36	12 0		
12 30	8.86	8.52	8.21	7.92	7.65	7.40	7.16	6.94	6.73	6.54	6.35	6.18	12 30		
13 0	8.50	8.20	7.91	7.64	7.39	7.15	6.93	6.72	6.53	6.34	6.17	6.00	13 0		
13 30	8.18	7.90	7.62	7.38	7.14	6.92	6.71	6.52	6.33	6.16	5.99	5.84	13 30		
14 0	7.88	7.61	7.36	7.13	6.91	6.70	6.51	6.32	6.15	5.98	5.83	5.68	14 0		
14 30	7.59	7.35	7.11	6.90	6.69	6.50	6.31	6.14	5.97	5.82	5.67	5.53	14 30		
15 0	7.33	7.10	6.88	6.68	6.48	6.30	6.13	5.96	5.81	5.66	5.52	5.39	15 0		
15 30	7.08	6.87	6.66	6.47	6.29	6.12	5.95	5.80	5.65	5.52	5.38	5.26	15 30		
16 0	6.85	6.65	6.45	6.28	6.10	5.94	5.79	5.64	5.51	5.37	5.25	5.13	16 0		
16 30	6.63	6.44	6.26	6.09	5.93	5.78	5.63	5.50	5.36	5.24	5.12	5.00	16 30		
17 0	6.42	6.25	6.08	5.92	5.76	5.62	5.48	5.35	5.23	5.10	4.99	4.89	17 0		
17 30	6.23	6.06	5.90	5.75	5.61	5.47	5.34	5.22	5.09	4.98	4.88	4.77	17 30		
18 0	6.04	5.89	5.73	5.60	5.46	5.33	5.20	5.08	4.97	4.87	4.76	4.66	18 0		
18 30	5.87	5.72	5.58	5.45	5.31	5.19	5.07	4.96	4.86	4.75	4.65	4.56	18 30		
19 0	5.70	5.56	5.43	5.30	5.18	5.06	4.95	4.84	4.74	4.64	4.55	4.46	19 0		
19 30	5.54	5.41	5.28	5.17	5.05	4.94	4.83	4.73	4.63	4.54	4.45	4.36	19 30		
20 0	5.39	5.27	5.15	5.04	4.92	4.82	4.72	4.62	4.53	4.43	4.35	4.27	20 0		
20 30	5.25	5.14	5.02	4.91	4.80	4.71	4.61	4.52	4.42	4.34	4.26	4.18	20 30		
21 0	5.12	5.01	4.89	4.79	4.69	4.60	4.50	4.41	4.33	4.25	4.17	4.09	21 0		
21 30	4.99	4.88	4.77	4.68	4.58	4.49	4.40	4.32	4.23	4.15	4.08	4.01	21 30		
22 0	4.86	4.76	4.66	4.57	4.47	4.39	4.30	4.22	4.14	4.06	3.99	3.92	22 0		
22 30	4.74	4.65	4.55	4.46	4.37	4.29	4.21	4.13	4.05	3.98	3.91	3.85	22 30		
23 0	4.63	4.54	4.44	4.36	4.27	4.20	4.12	4.04	3.97	3.90	3.84	3.77	23 0		
23 30	4.52	4.43	4.34	4.26	4.18	4.11	4.03	3.96	3.89	3.82	3.76	3.70	23 30		
24 0	4.41	4.33	4.24	4.17	4.09	4.02	3.95	3.87	3.81	3.75	3.69	3.63	24 0		
24 30	4.31	4.23	4.15	4.08	4.00	3.94	3.86	3.80	3.73	3.67	3.62	3.56	24 30		
25 0	4.21	4.14	4.06	3.99	3.92	3.85	3.79	3.72	3.66	3.60	3.55	3.49	25 0		
25 30	4.12	4.05	3.97	3.91	3.84	3.78	3.71	3.65	3.59	3.53	3.48	3.42	25 30		
26 0	4.03	3.96	3.89	3.83	3.76	3.70	3.64	3.57	3.52	3.46	3.41	3.36	26 0		
26 30	3.94	3.87	3.81	3.75	3.68	3.63	3.56	3.50	3.45	3.40	3.35	3.30	26 30		
27 0	3.85	3.79	3.73	3.67	3.61	3.55	3.49	3.43	3.39	3.34	3.29	3.24	27 0		
27 30	3.77	3.71	3.65	3.60	3.53	3.48	3.42	3.37	3.32	3.27	3.23	3.18	27 30		
28 0	3.69	3.63	3.58	3.52	3.47	3.41	3.36	3.31	3.26	3.21	3.17	3.12	28 0		
28 30	3.61	3.56	3.50	3.45	3.39	3.35	3.30	3.25	3.20	3.16	3.11	3.07	28 30		
29 0	3.54	3.49	3.43	3.38	3.33	3.29	3.24	3.19	3.15	3.10	3.06	3.02	29 0		
29 30	3.47	3.42	3.36	3.32	3.27	3.23	3.18	3.13	3.09	3.04	3.00	2.96	29 30		
30 0	3.40	3.35	3.30	3.26	3.21	3.17	3.12	3.07	3.03	2.99	2.95	2.91	30 0		

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to</i> —LATITUDE.												Latitude.
	0° 0'	0° 30'	1° 0'	1° 30'	2° 0'	2° 30'	3° 0'	3° 30'	4° 0'	4° 30'	5° 0'	5° 30'	
30° 0'	3.40	3.35	3.30	3.26	3.21	3.17	3.12	3.07	3.03	2.99	2.95	2.91	30° 0'
30 30	3.33	3.28	3.24	3.19	3.15	3.10	3.06	3.02	2.98	2.94	2.90	2.86	30 30
31 0	3.27	3.22	3.18	3.13	3.09	3.05	3.01	2.97	2.93	2.89	2.85	2.81	31 0
30 30	3.20	3.16	3.12	3.07	3.03	2.99	2.95	2.91	2.88	2.84	2.80	2.77	30 30
32 0	3.14	3.10	3.06	3.02	2.98	2.94	2.90	2.86	2.83	2.79	2.76	2.72	32 0
30 30	3.08	3.04	3.00	2.96	2.92	2.88	2.85	2.81	2.78	2.74	2.71	2.67	30 30
33 0	3.02	2.98	2.94	2.90	2.87	2.83	2.80	2.76	2.73	2.69	2.66	2.63	33 0
30 30	2.96	2.92	2.89	2.85	2.82	2.78	2.75	2.71	2.68	2.65	2.62	2.59	30 30
34 0	2.91	2.87	2.84	2.80	2.77	2.73	2.70	2.67	2.64	2.61	2.58	2.55	34 0
30 30	2.85	2.82	2.79	2.75	2.72	2.68	2.65	2.62	2.59	2.56	2.53	2.50	30 30
35 0	2.80	2.77	2.74	2.70	2.67	2.64	2.61	2.58	2.55	2.52	2.49	2.46	35 0
30 30	2.75	2.72	2.69	2.65	2.62	2.59	2.56	2.53	2.51	2.48	2.45	2.42	30 30
36 0	2.70	2.67	2.64	2.60	2.58	2.55	2.52	2.49	2.47	2.44	2.41	2.38	36 0
30 30	2.65	2.62	2.59	2.56	2.53	2.50	2.48	2.45	2.42	2.39	2.37	2.34	30 30
37 0	2.61	2.58	2.55	2.52	2.49	2.46	2.44	2.41	2.38	2.35	2.33	2.31	37 0
30 30	2.56	2.53	2.50	2.47	2.45	2.42	2.40	2.37	2.34	2.32	2.29	2.27	30 30
38 0	2.51	2.48	2.46	2.43	2.41	2.38	2.36	2.33	2.31	2.28	2.26	2.24	38 0
30 30	2.46	2.44	2.41	2.39	2.36	2.34	2.32	2.29	2.27	2.24	2.22	2.20	30 30
39 0	2.42	2.39	2.37	2.34	2.32	2.30	2.28	2.25	2.23	2.21	2.19	2.17	39 0
30 30	2.38	2.35	2.33	2.30	2.28	2.26	2.24	2.21	2.19	2.17	2.15	2.13	30 30
40 0	2.34	2.31	2.29	2.27	2.25	2.23	2.20	2.18	2.16	2.14	2.12	2.10	40 0
30 30	2.30	2.27	2.25	2.23	2.21	2.18	2.16	2.14	2.12	2.10	2.08	2.06	30 30
41 0	2.26	2.23	2.21	2.19	2.17	2.15	2.13	2.11	2.09	2.07	2.05	2.03	41 0
30 30	2.22	2.19	2.17	2.15	2.13	2.11	2.09	2.07	2.05	2.03	2.02	2.00	30 30
42 0	2.18	2.16	2.14	2.12	2.10	2.08	2.06	2.04	2.02	2.00	1.99	1.97	42 0
30 30	2.14	2.12	2.10	2.08	2.06	2.04	2.02	2.00	1.99	1.97	1.95	1.93	30 30
43 0	2.11	2.09	2.07	2.05	2.03	2.01	1.99	1.97	1.96	1.94	1.92	1.90	43 0
30 30	2.07	2.05	2.03	2.01	1.99	1.97	1.96	1.94	1.93	1.91	1.89	1.87	30 30
44 0	2.03	2.01	2.00	1.98	1.96	1.94	1.93	1.91	1.90	1.88	1.86	1.84	44 0
30 30	1.99	1.98	1.96	1.94	1.93	1.91	1.90	1.88	1.87	1.85	1.83	1.82	30 30
45 0	1.90	1.94	1.93	1.91	1.90	1.88	1.87	1.85	1.84	1.82	1.81	1.79	45 0
30 30	1.93	1.91	1.89	1.88	1.86	1.85	1.83	1.82	1.81	1.79	1.77	1.76	30 30
46 0	1.90	1.88	1.86	1.84	1.83	1.81	1.80	1.79	1.78	1.76	1.75	1.74	46 0
30 30	1.86	1.84	1.83	1.81	1.80	1.78	1.77	1.76	1.75	1.73	1.72	1.71	30 30
47 0	1.83	1.81	1.80	1.78	1.77	1.76	1.75	1.73	1.72	1.70	1.69	1.68	47 0
30 30	1.80	1.78	1.77	1.75	1.74	1.73	1.72	1.70	1.69	1.67	1.66	1.65	30 30
48 0	1.77	1.75	1.74	1.72	1.71	1.70	1.69	1.67	1.66	1.65	1.64	1.63	48 0
30 30	1.74	1.72	1.71	1.69	1.68	1.66	1.66	1.64	1.63	1.62	1.61	1.60	30 30
49 0	1.71	1.69	1.68	1.67	1.66	1.64	1.63	1.62	1.61	1.60	1.59	1.57	49 0
30 30	1.68	1.66	1.65	1.64	1.63	1.61	1.60	1.59	1.58	1.57	1.56	1.54	30 30
50 0	1.65	1.63	1.62	1.61	1.60	1.59	1.58	1.57	1.56	1.54	1.53	1.52	50 0
30 30	1.62	1.60	1.59	1.58	1.57	1.56	1.55	1.54	1.53	1.51	1.50	1.49	30 30
51 0	1.59	1.57	1.57	1.56	1.55	1.54	1.53	1.51	1.50	1.49	1.48	1.47	51 0
30 30	1.56	1.55	1.54	1.53	1.52	1.51	1.50	1.48	1.47	1.46	1.46	1.45	30 30
52 0	1.53	1.52	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.44	1.44	1.43	52 0
30 30	1.50	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.43	1.42	1.41	1.40	30 30
53 0	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.41	1.40	1.39	1.38	53 0
30 30	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.39	1.38	1.37	1.36	1.35	30 30
54 0	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.36	1.35	1.34	1.33	54 0
30 30	1.40	1.39	1.38	1.37	1.36	1.35	1.35	1.34	1.33	1.32	1.32	1.31	30 30
55 0	1.37	1.36	1.36	1.35	1.34	1.33	1.33	1.32	1.31	1.30	1.30	1.29	55 0
30 30	1.34	1.34	1.33	1.32	1.31	1.31	1.30	1.29	1.28	1.28	1.27	1.26	30 30
56 0	1.32	1.31	1.31	1.30	1.29	1.28	1.28	1.27	1.26	1.25	1.25	1.24	56 0
30 30	1.30	1.29	1.28	1.27	1.27	1.26	1.25	1.24	1.24	1.23	1.23	1.22	30 30
57 0	1.28	1.27	1.26	1.25	1.25	1.24	1.23	1.22	1.22	1.21	1.21	1.19	57 0
30 30	1.25	1.24	1.23	1.23	1.22	1.21	1.21	1.20	1.20	1.19	1.18	1.17	30 30
58 0	1.23	1.22	1.21	1.20	1.20	1.19	1.19	1.18	1.18	1.17	1.16	1.15	58 0
30 30	1.20	1.19	1.19	1.18	1.18	1.17	1.16	1.16	1.15	1.14	1.14	1.13	30 30
59 0	1.18	1.17	1.17	1.16	1.16	1.15	1.14	1.13	1.13	1.12	1.12	1.11	59 0
30 30	1.15	1.15	1.14	1.14	1.13	1.12	1.12	1.11	1.11	1.10	1.10	1.09	30 30
60 0	1.13	1.12	1.12	1.11	1.11	1.10	1.10	1.10	1.09	1.09	1.08	1.08	60 c

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to</i> —LATITUDE.												Latitude.
	6 0	6 30	7 0	7 30	8 0	8 30	9 0	9 30	10 0	10 30	11 0	11 30	
0 0	18.68	17.23	15.99	14.92	13.97	13.14	12.40	11.73	11.14	10.60	10.10	9.65	0 0
0 30	17.25	16.01	14.93	13.99	13.16	12.42	11.75	11.16	10.62	10.12	9.67	9.26	0 30
1 0	16.02	14.94	14.00	13.17	12.43	11.77	11.17	10.63	10.13	9.68	9.27	8.89	1 0
1 30	14.95	14.01	13.18	12.44	11.78	11.18	10.64	10.15	9.70	9.28	8.91	8.55	1 30
2 0	14.02	13.19	12.45	11.79	11.19	10.65	10.16	9.71	9.29	8.92	8.56	8.24	2 0
2 30	13.20	12.46	11.80	11.20	10.66	10.17	9.72	9.30	8.93	8.57	8.25	7.95	2 30
3 0	12.47	11.81	11.21	10.67	10.18	9.73	9.31	8.94	8.58	8.26	7.96	7.67	3 0
3 30	11.81	11.22	10.67	10.19	9.74	9.32	8.94	8.59	8.27	7.97	7.68	7.42	3 30
4 0	11.22	10.68	10.19	9.74	9.33	8.95	8.60	8.28	7.97	7.69	7.43	7.18	4 0
4 30	10.68	10.20	9.75	9.34	8.95	8.61	8.29	7.98	7.70	7.44	7.19	6.96	4 30
5 0	10.20	9.75	9.34	8.96	8.61	8.29	7.99	7.71	7.44	7.20	6.97	6.75	5 0
5 30	9.75	9.36	8.96	8.62	8.29	7.99	7.71	7.45	7.20	6.98	6.76	6.55	5 30
6 0	9.39	8.96	8.62	8.29	7.99	7.71	7.45	7.20	6.98	6.76	6.56	6.36	6 0
6 30	8.96	8.62	8.29	7.99	7.72	7.46	7.21	6.98	6.77	6.56	6.37	6.19	6 30
7 0	8.62	8.29	8.00	7.72	7.46	7.21	6.98	6.77	6.56	6.37	6.19	6.02	7 0
7 30	8.29	7.99	7.72	7.46	7.21	6.99	6.77	6.57	6.37	6.19	6.02	5.86	7 30
8 0	7.99	7.72	7.46	7.21	6.99	6.78	6.57	6.38	6.20	6.03	5.86	5.71	8 0
8 30	7.71	7.46	7.21	6.99	6.78	6.57	6.38	6.20	6.03	5.87	5.71	5.56	8 30
9 0	7.45	7.21	6.98	6.77	6.57	6.38	6.20	6.03	5.87	5.72	5.57	5.43	9 0
9 30	7.20	6.98	6.77	6.56	6.38	6.20	6.03	5.87	5.72	5.57	5.43	5.30	9 30
10 0	6.98	6.77	6.56	6.37	6.20	6.04	5.87	5.72	5.57	5.43	5.30	5.17	10 0
10 30	6.76	6.56	6.37	6.19	6.04	5.86	5.72	5.57	5.43	5.30	5.17	5.05	10 30
11 0	6.56	6.37	6.19	6.03	5.86	5.72	5.57	5.43	5.30	5.17	5.05	4.94	11 0
11 30	6.36	6.19	6.02	5.86	5.71	5.57	5.43	5.30	5.17	5.05	4.94	4.83	11 30
12 0	6.18	6.01	5.86	5.71	5.56	5.43	5.29	5.17	5.05	4.94	4.83	4.72	12 0
12 30	6.00	5.85	5.70	5.55	5.42	5.29	5.16	5.05	4.93	4.82	4.72	4.62	12 30
13 0	5.84	5.69	5.55	5.42	5.29	5.16	5.04	4.93	4.82	4.72	4.62	4.52	13 0
13 30	5.68	5.55	5.41	5.28	5.16	5.04	4.93	4.82	4.71	4.61	4.52	4.43	13 30
14 0	5.54	5.40	5.28	5.15	5.04	4.93	4.82	4.71	4.61	4.52	4.43	4.34	14 0
14 30	5.39	5.27	5.15	5.04	4.92	4.82	4.71	4.61	4.51	4.42	4.34	4.25	14 30
15 0	5.26	5.15	5.03	4.92	4.81	4.71	4.61	4.51	4.42	4.33	4.25	4.17	15 0
15 30	5.14	5.02	4.91	4.80	4.70	4.60	4.51	4.42	4.33	4.25	4.17	4.09	15 30
16 0	5.01	4.91	4.79	4.69	4.60	4.50	4.41	4.32	4.24	4.16	4.08	4.00	16 0
16 30	4.90	4.79	4.68	4.58	4.50	4.41	4.32	4.23	4.15	4.07	4.00	3.93	16 30
17 0	4.78	4.68	4.58	4.49	4.40	4.32	4.23	4.15	4.07	4.00	3.93	3.86	17 0
17 30	4.67	4.58	4.48	4.39	4.31	4.23	4.14	4.06	3.99	3.92	3.85	3.78	17 30
18 0	4.57	4.47	4.39	4.30	4.22	4.14	4.06	3.99	3.92	3.85	3.78	3.71	18 0
18 30	4.46	4.38	4.29	4.21	4.13	4.06	3.98	3.91	3.84	3.77	3.71	3.64	18 30
19 0	4.37	4.28	4.20	4.12	4.05	3.98	3.91	3.84	3.77	3.70	3.64	3.58	19 0
19 30	4.28	4.19	4.11	4.04	3.97	3.90	3.83	3.76	3.69	3.63	3.58	3.52	19 30
20 0	4.19	4.11	4.03	3.96	3.89	3.82	3.76	3.69	3.63	3.57	3.52	3.46	20 0
20 30	4.10	4.03	3.95	3.88	3.81	3.75	3.69	3.63	3.57	3.51	3.46	3.40	20 30
21 0	4.02	3.95	3.88	3.80	3.74	3.68	3.62	3.56	3.51	3.45	3.40	3.34	21 0
21 30	3.94	3.87	3.80	3.73	3.67	3.62	3.55	3.50	3.44	3.39	3.34	3.28	21 30
22 0	3.86	3.79	3.73	3.66	3.61	3.55	3.49	3.43	3.38	3.33	3.28	3.23	22 0
22 30	3.78	3.72	3.66	3.60	3.54	3.49	3.43	3.37	3.32	3.27	3.22	3.17	22 30
23 0	3.71	3.65	3.59	3.53	3.48	3.42	3.37	3.32	3.27	3.22	3.17	3.12	23 0
23 30	3.64	3.58	3.52	3.47	3.41	3.36	3.31	3.26	3.21	3.16	3.12	3.07	23 30
24 0	3.57	3.51	3.46	3.40	3.35	3.30	3.25	3.20	3.16	3.11	3.07	3.03	24 0
24 30	3.50	3.45	3.39	3.34	3.29	3.25	3.19	3.15	3.11	3.06	3.02	2.98	24 30
25 0	3.44	3.38	3.33	3.28	3.24	3.19	3.14	3.10	3.06	3.01	2.97	2.93	25 0
25 30	3.37	3.32	3.27	3.23	3.18	3.14	3.09	3.05	3.01	2.96	2.92	2.88	25 30
26 0	3.31	3.26	3.22	3.17	3.13	3.08	3.04	3.00	2.96	2.92	2.88	2.84	26 0
26 30	3.25	3.20	3.16	3.12	3.07	3.03	2.99	2.95	2.91	2.87	2.83	2.79	26 30
27 0	3.19	3.15	3.11	3.06	3.02	2.98	2.94	2.90	2.86	2.82	2.79	2.75	27 0
27 30	3.13	3.09	3.05	3.01	2.97	2.93	2.89	2.85	2.81	2.78	2.74	2.71	27 30
28 0	3.08	3.04	3.00	2.96	2.92	2.88	2.85	2.81	2.77	2.73	2.70	2.67	28 0
28 30	3.03	2.99	2.95	2.91	2.87	2.84	2.80	2.76	2.73	2.69	2.66	2.63	28 30
29 0	2.98	2.94	2.90	2.86	2.83	2.79	2.76	2.72	2.69	2.65	2.62	2.59	29 0
29 30	2.93	2.89	2.85	2.81	2.78	2.75	2.71	2.68	2.65	2.61	2.58	2.55	29 30
30 0	2.88	2.84	2.80	2.77	2.74	2.71	2.67	2.64	2.61	2.57	2.54	2.51	30 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to</i> —LATITUDE.												Latitude.
	6 0	6 30	7 0	7 30	8 0	8 30	9 0	9 30	10 0	10 30	11 0	11 30	
30 0	2.88	2.84	2.80	2.77	2.74	2.71	2.67	2.64	2.61	2.57	2.54	2.51	30 0
30 30	2.83	2.79	2.75	2.72	2.69	2.66	2.63	2.60	2.57	2.54	2.50	2.48	30 30
31 0	2.78	2.74	2.71	2.68	2.65	2.62	2.59	2.56	2.53	2.50	2.47	2.44	31 0
31 30	2.73	2.70	2.67	2.64	2.61	2.58	2.55	2.52	2.49	2.46	2.43	2.40	31 30
32 0	2.69	2.66	2.63	2.59	2.57	2.54	2.51	2.48	2.45	2.42	2.40	2.37	32 0
32 30	2.64	2.61	2.58	2.55	2.53	2.50	2.47	2.44	2.41	2.39	2.36	2.34	32 30
33 0	2.60	2.57	2.54	2.51	2.49	2.46	2.43	2.40	2.38	2.35	2.33	2.30	33 0
33 30	2.56	2.53	2.50	2.47	2.45	2.42	2.39	2.37	2.34	2.32	2.29	2.27	33 30
34 0	2.52	2.49	2.46	2.43	2.41	2.38	2.36	2.33	2.31	2.28	2.26	2.23	34 0
34 30	2.48	2.45	2.42	2.40	2.37	2.35	2.32	2.30	2.27	2.25	2.22	2.20	34 30
35 0	2.44	2.41	2.39	2.36	2.34	2.31	2.29	2.26	2.24	2.21	2.19	2.17	35 0
35 30	2.40	2.37	2.35	2.32	2.30	2.27	2.25	2.23	2.20	2.18	2.16	2.14	35 30
36 0	2.36	2.33	2.31	2.28	2.26	2.24	2.22	2.19	2.17	2.15	2.13	2.11	36 0
36 30	2.32	2.30	2.27	2.25	2.23	2.21	2.18	2.16	2.14	2.12	2.10	2.08	36 30
37 0	2.29	2.26	2.24	2.22	2.20	2.17	2.15	2.13	2.11	2.09	2.07	2.05	37 0
37 30	2.25	2.23	2.20	2.18	2.16	2.14	2.12	2.10	2.08	2.06	2.04	2.02	37 30
38 0	2.22	2.19	2.17	2.15	2.13	2.11	2.09	2.07	2.05	2.03	2.01	1.99	38 0
38 30	2.18	2.16	2.14	2.12	2.10	2.08	2.06	2.04	2.02	2.00	1.98	1.97	38 30
39 0	2.15	2.13	2.11	2.09	2.07	2.05	2.03	2.01	1.99	1.97	1.96	1.94	39 0
39 30	2.11	2.09	2.07	2.05	2.03	2.01	2.00	1.98	1.96	1.94	1.93	1.91	39 30
40 0	2.08	2.06	2.04	2.02	2.00	1.98	1.97	1.95	1.93	1.91	1.90	1.88	40 0
40 30	2.05	2.03	2.01	1.99	1.97	1.95	1.94	1.92	1.90	1.89	1.87	1.86	40 30
41 0	2.02	2.00	1.98	1.96	1.94	1.92	1.91	1.89	1.88	1.86	1.85	1.83	41 0
41 30	1.98	1.96	1.95	1.93	1.91	1.90	1.88	1.86	1.85	1.83	1.82	1.80	41 30
42 0	1.95	1.93	1.92	1.90	1.89	1.87	1.85	1.83	1.82	1.80	1.79	1.77	42 0
42 30	1.92	1.90	1.89	1.87	1.86	1.84	1.82	1.81	1.79	1.78	1.76	1.75	42 30
43 0	1.89	1.87	1.86	1.84	1.83	1.81	1.80	1.78	1.77	1.75	1.74	1.72	43 0
43 30	1.86	1.84	1.83	1.81	1.80	1.78	1.77	1.76	1.74	1.73	1.71	1.70	43 30
44 0	1.83	1.81	1.80	1.78	1.77	1.76	1.75	1.73	1.72	1.70	1.69	1.68	44 0
44 30	1.80	1.79	1.77	1.76	1.74	1.73	1.72	1.71	1.69	1.68	1.66	1.65	44 30
45 0	1.78	1.76	1.75	1.73	1.72	1.71	1.70	1.68	1.67	1.65	1.64	1.63	45 0
45 30	1.76	1.74	1.72	1.71	1.69	1.68	1.67	1.66	1.64	1.63	1.62	1.61	45 30
46 0	1.72	1.71	1.70	1.68	1.67	1.65	1.64	1.63	1.62	1.61	1.60	1.58	46 0
46 30	1.69	1.68	1.67	1.65	1.64	1.63	1.62	1.61	1.59	1.58	1.57	1.56	46 30
47 0	1.67	1.65	1.64	1.63	1.62	1.61	1.60	1.58	1.57	1.56	1.55	1.54	47 0
47 30	1.64	1.63	1.61	1.60	1.59	1.58	1.57	1.56	1.55	1.54	1.52	1.51	47 30
48 0	1.62	1.60	1.59	1.58	1.57	1.56	1.55	1.54	1.53	1.51	1.50	1.49	48 0
48 30	1.59	1.58	1.56	1.55	1.54	1.53	1.52	1.51	1.50	1.49	1.48	1.47	48 30
49 0	1.56	1.55	1.54	1.53	1.52	1.51	1.50	1.49	1.48	1.47	1.46	1.45	49 0
49 30	1.53	1.52	1.51	1.50	1.49	1.48	1.47	1.47	1.46	1.45	1.44	1.43	49 30
50 0	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.44	1.44	1.43	1.42	1.41	50 0
50 30	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.39	50 30
51 0	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	51 0
51 30	1.44	1.43	1.42	1.41	1.40	1.40	1.39	1.38	1.37	1.36	1.35	1.34	51 30
52 0	1.42	1.41	1.40	1.39	1.38	1.37	1.37	1.36	1.35	1.34	1.33	1.32	52 0
52 30	1.39	1.38	1.37	1.36	1.36	1.35	1.34	1.34	1.33	1.32	1.31	1.30	52 30
53 0	1.37	1.36	1.35	1.34	1.34	1.33	1.32	1.31	1.31	1.30	1.29	1.28	53 0
53 30	1.35	1.34	1.33	1.32	1.31	1.31	1.30	1.29	1.28	1.28	1.27	1.26	53 30
54 0	1.33	1.32	1.31	1.30	1.29	1.28	1.28	1.27	1.26	1.25	1.25	1.24	54 0
54 30	1.30	1.30	1.29	1.28	1.27	1.26	1.26	1.25	1.24	1.23	1.23	1.22	54 30
55 0	1.28	1.27	1.27	1.26	1.25	1.24	1.24	1.23	1.22	1.21	1.21	1.20	55 0
55 30	1.26	1.25	1.24	1.23	1.23	1.22	1.22	1.21	1.20	1.19	1.19	1.18	55 30
56 0	1.24	1.23	1.22	1.21	1.21	1.20	1.20	1.19	1.18	1.17	1.17	1.16	56 0
56 30	1.21	1.21	1.20	1.19	1.19	1.18	1.18	1.17	1.16	1.15	1.15	1.14	56 30
57 0	1.19	1.19	1.18	1.17	1.17	1.16	1.16	1.15	1.14	1.13	1.13	1.12	57 0
57 30	1.17	1.16	1.16	1.15	1.15	1.14	1.14	1.13	1.12	1.12	1.11	1.10	57 30
58 0	1.15	1.14	1.14	1.13	1.13	1.12	1.12	1.11	1.11	1.10	1.09	1.08	58 0
58 30	1.13	1.12	1.12	1.11	1.11	1.10	1.10	1.09	1.09	1.08	1.07	1.07	58 30
59 0	1.11	1.10	1.10	1.09	1.09	1.08	1.08	1.07	1.07	1.06	1.06	1.05	59 0
59 30	1.09	1.08	1.08	1.07	1.07	1.06	1.06	1.05	1.05	1.04	1.04	1.03	59 30
60 0	1.07	1.07	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.01	60 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to</i> —LATITUDE.												Latitude.
	12 0	12 30	13 0	13 30	14 0	14 30	15 0	15 30	16 0	16 30	17 0	17 30	
0 0	9.24	8.86	8.50	8.18	7.88	7.59	7.33	7.08	6.85	6.63	6.42	6.23	0 0
30	8.88	8.52	8.20	7.90	7.61	7.35	7.10	6.87	6.65	6.44	6.25	6.06	30
1 0	8.54	8.21	7.91	7.62	7.36	7.11	6.88	6.66	6.45	6.26	6.08	5.90	1 0
30	8.23	7.92	7.64	7.38	7.13	6.90	6.68	6.47	6.28	6.09	5.92	5.75	30
2 0	7.93	7.65	7.39	7.14	6.91	6.69	6.48	6.29	6.10	5.93	5.76	5.61	2 0
30	7.66	7.40	7.15	6.92	6.70	6.50	6.30	6.12	5.94	5.78	5.62	5.47	30
3 0	7.41	7.16	6.93	6.71	6.51	6.31	6.13	5.95	5.79	5.63	5.48	5.34	3 0
30	7.17	6.94	6.72	6.52	6.32	6.14	5.96	5.80	5.64	5.50	5.35	5.22	30
4 0	6.95	6.73	6.53	6.33	6.15	5.97	5.81	5.65	5.51	5.36	5.23	5.09	4 0
30	6.74	6.54	6.34	6.16	5.98	5.82	5.66	5.52	5.37	5.24	5.10	4.98	30
5 0	6.54	6.35	6.17	5.99	5.83	5.67	5.52	5.38	5.25	5.12	4.99	4.88	5 0
30	6.36	6.18	6.00	5.84	5.68	5.53	5.39	5.26	5.13	5.00	4.89	4.77	30
6 0	6.18	6.00	5.84	5.68	5.54	5.39	5.26	5.14	5.01	4.90	4.78	4.67	6 0
30	6.01	5.85	5.69	5.55	5.40	5.27	5.15	5.02	4.91	4.79	4.68	4.58	30
7 0	5.86	5.70	5.55	5.41	5.28	5.15	5.03	4.91	4.79	4.68	4.58	4.48	7 0
30	5.71	5.56	5.42	5.29	5.16	5.04	4.92	4.80	4.69	4.59	4.49	4.39	30
8 0	5.56	5.42	5.29	5.16	5.04	4.92	4.81	4.70	4.60	4.50	4.40	4.31	8 0
30	5.42	5.29	5.16	5.04	4.93	4.82	4.71	4.60	4.50	4.41	4.32	4.23	30
9 0	5.29	5.16	5.04	4.93	4.82	4.71	4.61	4.51	4.41	4.32	4.23	4.14	9 0
30	5.17	5.05	4.93	4.82	4.71	4.61	4.51	4.42	4.32	4.23	4.15	4.06	30
10 0	5.05	4.93	4.82	4.71	4.61	4.51	4.42	4.33	4.24	4.15	4.07	3.99	10 0
30	4.94	4.83	4.72	4.62	4.52	4.42	4.33	4.25	4.16	4.07	4.00	3.92	30
11 0	4.83	4.72	4.62	4.52	4.43	4.34	4.25	4.17	4.08	4.00	3.93	3.85	11 0
30	4.72	4.62	4.52	4.43	4.34	4.25	4.17	4.09	4.00	3.93	3.86	3.78	30
12 0	4.62	4.52	4.43	4.34	4.25	4.17	4.09	4.01	3.93	3.86	3.79	3.72	12 0
30	4.52	4.43	4.34	4.25	4.17	4.09	4.01	3.93	3.86	3.79	3.72	3.65	30
13 0	4.43	4.34	4.25	4.17	4.09	4.01	3.94	3.86	3.79	3.72	3.66	3.59	13 0
30	4.34	4.25	4.17	4.09	4.01	3.94	3.87	3.79	3.72	3.66	3.60	3.53	30
14 0	4.25	4.17	4.09	4.01	3.94	3.87	3.80	3.73	3.66	3.60	3.54	3.48	14 0
30	4.17	4.09	4.01	3.94	3.87	3.80	3.73	3.66	3.60	3.54	3.48	3.42	30
15 0	4.09	4.01	3.94	3.87	3.80	3.73	3.66	3.60	3.54	3.48	3.42	3.36	15 0
30	4.01	3.93	3.86	3.79	3.73	3.66	3.60	3.54	3.48	3.42	3.36	3.31	30
16 0	3.93	3.86	3.79	3.72	3.66	3.60	3.54	3.48	3.42	3.36	3.31	3.26	16 0
30	3.86	3.79	3.72	3.66	3.60	3.54	3.48	3.42	3.36	3.31	3.26	3.21	30
17 0	3.79	3.72	3.66	3.60	3.54	3.48	3.42	3.36	3.31	3.26	3.21	3.16	17 0
30	3.72	3.65	3.60	3.53	3.48	3.42	3.36	3.31	3.26	3.21	3.16	3.11	30
18 0	3.65	3.59	3.53	3.47	3.42	3.36	3.31	3.26	3.21	3.16	3.11	3.06	18 0
30	3.59	3.53	3.47	3.41	3.36	3.31	3.26	3.21	3.16	3.11	3.06	3.02	30
19 0	3.53	3.47	3.41	3.36	3.31	3.26	3.21	3.16	3.11	3.06	3.02	2.97	19 0
30	3.47	3.41	3.36	3.30	3.25	3.20	3.16	3.11	3.06	3.02	2.97	2.93	30
20 0	3.41	3.35	3.30	3.25	3.20	3.15	3.11	3.06	3.02	2.97	2.93	2.89	20 0
30	3.35	3.29	3.25	3.19	3.15	3.10	3.06	3.01	2.97	2.93	2.89	2.85	30
21 0	3.29	3.24	3.19	3.14	3.10	3.05	3.01	2.97	2.93	2.89	2.85	2.81	21 0
30	3.23	3.18	3.14	3.09	3.05	3.01	2.96	2.92	2.88	2.84	2.81	2.77	30
22 0	3.18	3.13	3.09	3.05	3.01	2.96	2.92	2.88	2.84	2.80	2.77	2.73	22 0
30	3.13	3.08	3.04	3.00	2.96	2.92	2.88	2.84	2.80	2.76	2.73	2.69	30
23 0	3.08	3.04	3.00	2.95	2.91	2.88	2.84	2.80	2.76	2.72	2.69	2.65	23 0
30	3.03	2.99	2.95	2.91	2.88	2.83	2.79	2.75	2.72	2.68	2.65	2.61	30
24 0	2.99	2.95	2.90	2.86	2.83	2.79	2.75	2.71	2.68	2.64	2.61	2.58	24 0
30	2.94	2.90	2.86	2.82	2.78	2.74	2.71	2.67	2.64	2.61	2.57	2.54	30
25 0	2.89	2.85	2.82	2.78	2.74	2.70	2.67	2.64	2.61	2.57	2.54	2.51	25 0
30	2.84	2.81	2.77	2.73	2.70	2.66	2.63	2.60	2.57	2.54	2.50	2.47	30
26 0	2.80	2.76	2.73	2.69	2.66	2.63	2.60	2.57	2.54	2.50	2.47	2.44	26 0
30	2.76	2.72	2.69	2.65	2.62	2.59	2.56	2.53	2.50	2.47	2.44	2.41	30
27 0	2.72	2.68	2.65	2.62	2.59	2.56	2.53	2.50	2.47	2.44	2.41	2.38	27 0
30	2.68	2.64	2.61	2.58	2.55	2.52	2.49	2.46	2.43	2.40	2.37	2.34	30
28 0	2.64	2.60	2.57	2.54	2.51	2.48	2.46	2.43	2.40	2.37	2.34	2.31	28 0
30	2.60	2.56	2.53	2.50	2.47	2.44	2.42	2.39	2.36	2.33	2.31	2.28	30
29 0	2.56	2.53	2.50	2.47	2.44	2.41	2.39	2.36	2.33	2.30	2.28	2.25	29 0
30	2.52	2.49	2.46	2.43	2.41	2.38	2.35	2.32	2.30	2.27	2.25	2.22	30
30 0	2.49	2.46	2.43	2.40	2.38	2.35	2.32	2.29	2.27	2.24	2.22	2.20	30 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to—</i> LATITUDE.												Latitude.
	12 0	12 30	13 0	13 30	14 0	14 30	15 0	15 30	16 0	16 30	17 0	17 30	
30 0	2.49	2.46	2.43	2.40	2.38	2.35	2.32	2.29	2.27	2.24	2.22	2.20	30 0
30 30	2.45	2.42	2.39	2.37	2.34	2.32	2.29	2.26	2.24	2.22	2.19	2.17	30 30
31 0	2.41	2.38	2.36	2.33	2.31	2.28	2.26	2.23	2.21	2.19	2.17	2.14	31 0
30 30	2.37	2.35	2.32	2.30	2.28	2.25	2.23	2.20	2.18	2.16	2.14	2.12	30 30
32 0	2.34	2.32	2.29	2.27	2.25	2.22	2.20	2.17	2.15	2.13	2.11	2.09	32 0
30 30	2.31	2.28	2.26	2.24	2.21	2.19	2.17	2.15	2.12	2.10	2.08	2.06	30 30
33 0	2.28	2.25	2.23	2.20	2.18	2.16	2.14	2.12	2.10	2.08	2.06	2.04	33 0
30 30	2.24	2.22	2.20	2.18	2.15	2.13	2.11	2.09	2.07	2.05	2.03	2.01	30 30
34 0	2.21	2.19	2.17	2.15	2.13	2.10	2.08	2.06	2.04	2.02	2.00	1.98	34 0
30 30	2.18	2.16	2.14	2.12	2.10	2.08	2.05	2.03	2.01	1.99	1.97	1.96	30 30
35 0	2.15	2.13	2.11	2.09	2.07	2.05	2.03	2.01	1.99	1.97	1.95	1.93	35 0
30 30	2.12	2.10	2.08	2.06	2.04	2.02	2.00	1.98	1.96	1.94	1.92	1.91	30 30
36 0	2.09	2.07	2.05	2.03	2.01	1.99	1.97	1.95	1.94	1.92	1.90	1.88	36 0
30 30	2.06	2.04	2.02	2.00	1.98	1.96	1.94	1.93	1.91	1.89	1.87	1.86	30 30
37 0	2.03	2.01	1.99	1.97	1.96	1.94	1.92	1.90	1.89	1.87	1.85	1.83	37 0
30 30	2.00	1.98	1.96	1.95	1.93	1.91	1.89	1.88	1.86	1.85	1.83	1.81	30 30
38 0	1.98	1.96	1.94	1.92	1.91	1.89	1.87	1.85	1.84	1.82	1.81	1.79	38 0
30 30	1.95	1.93	1.91	1.90	1.88	1.86	1.84	1.83	1.81	1.80	1.78	1.77	30 30
39 0	1.92	1.90	1.89	1.87	1.85	1.83	1.82	1.80	1.79	1.77	1.76	1.74	39 0
30 30	1.89	1.88	1.86	1.84	1.82	1.81	1.79	1.78	1.76	1.75	1.74	1.72	30 30
40 0	1.87	1.85	1.84	1.82	1.80	1.78	1.77	1.75	1.74	1.73	1.72	1.70	40 0
30 30	1.84	1.82	1.81	1.79	1.78	1.76	1.75	1.73	1.72	1.71	1.69	1.68	30 30
41 0	1.81	1.80	1.78	1.77	1.76	1.74	1.73	1.71	1.70	1.68	1.67	1.65	41 0
30 30	1.78	1.77	1.76	1.75	1.73	1.72	1.70	1.69	1.67	1.66	1.65	1.63	30 30
42 0	1.76	1.75	1.74	1.72	1.71	1.69	1.68	1.66	1.65	1.64	1.63	1.61	42 0
30 30	1.73	1.72	1.71	1.70	1.68	1.67	1.66	1.64	1.63	1.62	1.61	1.59	30 30
43 0	1.71	1.70	1.69	1.67	1.66	1.65	1.64	1.62	1.61	1.60	1.59	1.57	43 0
30 30	1.69	1.68	1.66	1.65	1.64	1.63	1.61	1.60	1.59	1.58	1.56	1.55	30 30
44 0	1.67	1.65	1.64	1.63	1.62	1.60	1.59	1.58	1.57	1.55	1.54	1.53	44 0
30 30	1.64	1.63	1.62	1.61	1.59	1.58	1.57	1.56	1.55	1.53	1.52	1.51	30 30
45 0	1.62	1.61	1.60	1.58	1.57	1.56	1.55	1.54	1.53	1.51	1.50	1.49	45 0
30 30	1.59	1.58	1.57	1.56	1.55	1.54	1.53	1.52	1.50	1.49	1.48	1.47	30 30
46 0	1.57	1.56	1.55	1.54	1.53	1.52	1.51	1.49	1.48	1.47	1.46	1.45	46 0
30 30	1.55	1.54	1.53	1.52	1.51	1.50	1.48	1.47	1.46	1.45	1.44	1.43	30 30
47 0	1.53	1.52	1.51	1.50	1.49	1.47	1.46	1.45	1.44	1.43	1.42	1.41	47 0
30 30	1.50	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39	30 30
48 0	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.41	1.40	1.39	1.38	48 0
30 30	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.39	1.38	1.37	1.36	30 30
49 0	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.37	1.36	1.35	1.34	49 0
30 30	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.36	1.35	1.34	1.33	1.32	30 30
50 0	1.40	1.39	1.38	1.37	1.36	1.35	1.35	1.34	1.33	1.32	1.31	1.30	50 0
30 30	1.38	1.37	1.36	1.35	1.34	1.33	1.33	1.32	1.31	1.30	1.29	1.28	30 30
51 0	1.36	1.35	1.34	1.33	1.32	1.31	1.31	1.30	1.29	1.28	1.27	1.26	51 0
30 30	1.34	1.33	1.32	1.31	1.30	1.29	1.29	1.28	1.27	1.26	1.25	1.25	30 30
52 0	1.32	1.31	1.30	1.29	1.28	1.27	1.27	1.26	1.25	1.24	1.24	1.23	52 0
30 30	1.30	1.29	1.28	1.27	1.26	1.26	1.25	1.24	1.23	1.23	1.22	1.21	30 30
53 0	1.28	1.27	1.26	1.25	1.25	1.24	1.23	1.22	1.22	1.21	1.20	1.19	53 0
30 30	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.20	1.20	1.19	1.18	1.18	30 30
54 0	1.24	1.23	1.22	1.21	1.21	1.20	1.19	1.18	1.18	1.17	1.17	1.16	54 0
30 30	1.22	1.21	1.20	1.19	1.19	1.18	1.17	1.16	1.16	1.15	1.15	1.14	30 30
55 0	1.20	1.19	1.18	1.17	1.17	1.16	1.16	1.14	1.14	1.13	1.13	1.12	55 0
30 30	1.18	1.17	1.16	1.16	1.15	1.14	1.14	1.13	1.12	1.12	1.11	1.11	30 30
56 0	1.16	1.15	1.15	1.14	1.13	1.12	1.12	1.11	1.11	1.10	1.10	1.09	56 0
30 30	1.14	1.13	1.13	1.12	1.11	1.11	1.10	1.10	1.09	1.08	1.08	1.07	30 30
57 0	1.12	1.11	1.11	1.10	1.10	1.09	1.09	1.08	1.07	1.06	1.06	1.05	57 0
30 30	1.10	1.09	1.09	1.08	1.08	1.07	1.07	1.06	1.05	1.05	1.04	1.04	30 30
58 0	1.08	1.07	1.07	1.06	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	58 0
30 30	1.06	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.01	1.01	30 30
59 0	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.01	1.01	1.00	1.00	0.99	59 0
30 30	1.03	1.02	1.02	1.01	1.01	1.00	1.00	0.99	0.99	0.98	0.98	0.97	30 30
60 0	1.01	1.00	1.00	0.99	0.99	0.98	0.98	0.97	0.97	0.96	0.96	0.95	60 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to—</i> LATITUDE.												Latitude.
	18 0	18 30	19 0	19 30	20 0	20 30	21 0	21 30	22 0	22 30	23 0	23 30	
0 0	6.04	5.87	5.70	5.54	5.39	5.25	5.12	4.99	4.86	4.74	4.63	4.52	0 0
0 30	5.89	5.72	5.56	5.41	5.27	5.14	5.01	4.88	4.76	4.64	4.53	4.43	0 30
1 0	5.73	5.58	5.43	5.28	5.15	5.02	4.89	4.77	4.66	4.55	4.44	4.34	1 0
1 30	5.60	5.45	5.30	5.17	5.04	4.91	4.79	4.68	4.57	4.46	4.35	4.26	1 30
2 0	5.46	5.31	5.18	5.05	4.92	4.80	4.69	4.58	4.47	4.37	4.27	4.18	2 0
2 30	5.33	5.19	5.06	4.94	4.82	4.71	4.60	4.49	4.39	4.29	4.19	4.11	2 30
3 0	5.20	5.07	4.95	4.83	4.72	4.61	4.50	4.40	4.30	4.21	4.12	4.03	3 0
3 30	5.08	4.96	4.84	4.73	4.62	4.52	4.41	4.32	4.22	4.13	4.04	3.96	3 30
4 0	4.97	4.86	4.74	4.63	4.53	4.42	4.33	4.23	4.14	4.05	3.97	3.89	4 0
4 30	4.87	4.75	4.64	4.54	4.43	4.34	4.25	4.15	4.06	3.98	3.90	3.83	4 30
5 0	4.76	4.65	4.55	4.45	4.35	4.26	4.17	4.08	3.99	3.91	3.84	3.76	5 0
5 30	4.66	4.56	4.46	4.36	4.27	4.18	4.09	4.01	3.92	3.85	3.77	3.70	5 30
6 0	4.57	4.46	4.37	4.28	4.19	4.10	4.02	3.94	3.86	3.78	3.71	3.64	6 0
6 30	4.47	4.38	4.28	4.19	4.11	4.03	3.95	3.87	3.79	3.72	3.65	3.58	6 30
7 0	4.39	4.29	4.20	4.11	4.03	3.95	3.88	3.80	3.73	3.66	3.59	3.52	7 0
7 30	4.30	4.21	4.12	4.04	3.96	3.88	3.80	3.73	3.66	3.60	3.53	3.47	7 30
8 0	4.22	4.13	4.05	3.97	3.89	3.81	3.74	3.67	3.61	3.54	3.48	3.41	8 0
8 30	4.14	4.06	3.98	3.90	3.82	3.75	3.68	3.62	3.55	3.48	3.42	3.36	8 30
9 0	4.06	3.98	3.91	3.83	3.76	3.69	3.62	3.55	3.49	3.43	3.37	3.31	9 0
9 30	3.99	3.91	3.84	3.76	3.69	3.63	3.56	3.50	3.43	3.37	3.32	3.26	9 30
10 0	3.92	3.84	3.77	3.69	3.63	3.57	3.51	3.44	3.38	3.32	3.27	3.21	10 0
10 30	3.85	3.77	3.70	3.63	3.57	3.51	3.45	3.39	3.33	3.27	3.22	3.16	10 30
11 0	3.78	3.71	3.64	3.58	3.52	3.46	3.40	3.34	3.28	3.22	3.17	3.12	11 0
11 30	3.71	3.64	3.58	3.52	3.46	3.40	3.34	3.28	3.23	3.17	3.12	3.07	11 30
12 0	3.65	3.59	3.53	3.47	3.41	3.35	3.29	3.23	3.18	3.13	3.08	3.03	12 0
12 30	3.59	3.53	3.47	3.41	3.35	3.29	3.24	3.18	3.13	3.08	3.04	2.99	12 30
13 0	3.53	3.47	3.41	3.35	3.30	3.24	3.19	3.14	3.09	3.04	3.00	2.95	13 0
13 30	3.47	3.41	3.36	3.30	3.25	3.19	3.14	3.09	3.05	3.00	2.95	2.91	13 30
14 0	3.42	3.36	3.31	3.25	3.20	3.15	3.10	3.05	3.01	2.96	2.91	2.87	14 0
14 30	3.36	3.31	3.26	3.20	3.15	3.10	3.05	3.01	2.96	2.92	2.87	2.83	14 30
15 0	3.31	3.26	3.21	3.16	3.11	3.06	3.01	2.96	2.92	2.88	2.84	2.79	15 0
15 30	3.26	3.21	3.16	3.11	3.06	3.01	2.97	2.92	2.88	2.84	2.80	2.76	15 30
16 0	3.21	3.16	3.11	3.06	3.02	2.97	2.93	2.88	2.84	2.80	2.76	2.72	16 0
16 30	3.16	3.11	3.06	3.02	2.97	2.93	2.89	2.84	2.80	2.76	2.72	2.69	16 30
17 0	3.11	3.06	3.02	2.97	2.93	2.89	2.85	2.81	2.77	2.73	2.69	2.65	17 0
17 30	3.06	3.02	2.97	2.93	2.89	2.85	2.81	2.77	2.73	2.69	2.65	2.62	17 30
18 0	3.02	2.97	2.93	2.89	2.85	2.81	2.77	2.73	2.69	2.65	2.62	2.58	18 0
18 30	2.97	2.93	2.89	2.85	2.81	2.77	2.73	2.69	2.65	2.62	2.58	2.55	18 30
19 0	2.93	2.89	2.85	2.81	2.77	2.73	2.70	2.66	2.62	2.58	2.55	2.52	19 0
19 30	2.89	2.85	2.81	2.77	2.73	2.70	2.66	2.62	2.59	2.55	2.52	2.49	19 30
20 0	2.85	2.81	2.77	2.73	2.70	2.66	2.63	2.59	2.56	2.52	2.49	2.46	20 0
20 30	2.81	2.77	2.73	2.70	2.66	2.63	2.59	2.56	2.52	2.49	2.46	2.43	20 30
21 0	2.77	2.73	2.70	2.66	2.63	2.59	2.56	2.52	2.49	2.46	2.43	2.40	21 0
21 30	2.73	2.69	2.66	2.62	2.59	2.56	2.52	2.49	2.46	2.43	2.40	2.37	21 30
22 0	2.69	2.65	2.62	2.59	2.56	2.52	2.49	2.46	2.43	2.40	2.37	2.34	22 0
22 30	2.65	2.62	2.58	2.55	2.52	2.49	2.46	2.43	2.40	2.37	2.34	2.31	22 30
23 0	2.62	2.58	2.55	2.52	2.49	2.46	2.43	2.40	2.37	2.34	2.31	2.28	23 0
23 30	2.58	2.55	2.52	2.49	2.46	2.43	2.40	2.37	2.34	2.31	2.28	2.26	23 30
24 0	2.55	2.52	2.49	2.46	2.43	2.40	2.37	2.34	2.31	2.28	2.26	2.23	24 0
24 30	2.51	2.48	2.45	2.42	2.39	2.36	2.34	2.31	2.28	2.26	2.23	2.20	24 30
25 0	2.48	2.45	2.42	2.39	2.36	2.33	2.31	2.28	2.26	2.23	2.20	2.17	25 0
25 30	2.45	2.42	2.39	2.36	2.33	2.31	2.28	2.25	2.23	2.20	2.17	2.15	25 30
26 0	2.42	2.39	2.36	2.33	2.31	2.28	2.25	2.22	2.20	2.17	2.15	2.12	26 0
26 30	2.38	2.35	2.33	2.30	2.28	2.25	2.22	2.20	2.17	2.15	2.12	2.10	26 30
27 0	2.35	2.32	2.30	2.27	2.25	2.22	2.20	2.17	2.15	2.12	2.10	2.08	27 0
27 30	2.32	2.29	2.27	2.24	2.22	2.19	2.17	2.14	2.12	2.10	2.07	2.05	27 30
28 0	2.29	2.26	2.24	2.21	2.19	2.16	2.14	2.12	2.10	2.07	2.05	2.03	28 0
28 30	2.26	2.23	2.21	2.18	2.16	2.14	2.11	2.09	2.07	2.05	2.03	2.00	28 30
29 0	2.23	2.20	2.18	2.16	2.14	2.11	2.09	2.07	2.05	2.03	2.01	1.98	29 0
29 30	2.20	2.18	2.15	2.13	2.11	2.09	2.06	2.04	2.02	2.00	1.98	1.96	29 30
30 0	2.18	2.15	2.13	2.11	2.09	2.07	2.04	2.02	2.00	1.98	1.96	1.94	30 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to</i> —LATITUDE.												Latitude.
	18 0	18 30	19 0	19 30	20 0	20 30	21 0	21 30	22 0	22 30	23 0	23 30	
30 0	2.18	2.15	2.13	2.11	2.09	2.07	2.04	2.02	2.00	1.98	1.96	1.94	30 0
30 30	2.15	2.13	2.10	2.08	2.06	2.04	2.01	1.99	1.97	1.95	1.93	1.91	30 30
31 0	2.12	2.10	2.08	2.06	2.04	2.01	1.99	1.97	1.95	1.93	1.91	1.89	31 0
30 30	2.09	2.07	2.05	2.03	2.01	1.99	1.97	1.95	1.93	1.91	1.89	1.87	30 30
32 0	2.07	2.05	2.03	2.01	1.99	1.97	1.95	1.93	1.91	1.89	1.87	1.85	32 0
30 30	2.04	2.02	2.00	1.98	1.96	1.94	1.92	1.90	1.88	1.86	1.85	1.83	30 30
33 0	2.02	2.00	1.98	1.96	1.94	1.92	1.90	1.88	1.86	1.84	1.83	1.81	33 0
30 30	1.99	1.97	1.95	1.93	1.91	1.90	1.88	1.86	1.84	1.82	1.80	1.78	30 30
34 0	1.96	1.94	1.93	1.91	1.89	1.87	1.86	1.84	1.82	1.80	1.78	1.76	34 0
30 30	1.94	1.92	1.90	1.89	1.87	1.85	1.83	1.82	1.80	1.78	1.76	1.75	30 30
35 0	1.92	1.90	1.88	1.86	1.85	1.83	1.81	1.79	1.78	1.76	1.75	1.73	35 0
30 30	1.89	1.87	1.85	1.84	1.82	1.81	1.79	1.77	1.76	1.74	1.73	1.71	30 30
36 0	1.87	1.85	1.83	1.81	1.80	1.78	1.77	1.75	1.74	1.72	1.71	1.69	36 0
30 30	1.84	1.83	1.81	1.79	1.78	1.76	1.75	1.73	1.72	1.70	1.69	1.67	30 30
37 0	1.82	1.80	1.79	1.77	1.76	1.74	1.73	1.71	1.70	1.68	1.67	1.65	37 0
30 30	1.79	1.78	1.76	1.75	1.73	1.72	1.71	1.69	1.68	1.66	1.65	1.63	30 30
38 0	1.77	1.75	1.74	1.72	1.71	1.70	1.69	1.67	1.66	1.64	1.63	1.61	38 0
30 30	1.75	1.73	1.72	1.70	1.69	1.68	1.66	1.65	1.64	1.62	1.61	1.59	30 30
39 0	1.73	1.71	1.70	1.68	1.67	1.65	1.64	1.63	1.62	1.60	1.59	1.57	39 0
30 30	1.71	1.69	1.68	1.66	1.65	1.64	1.62	1.61	1.60	1.58	1.57	1.55	30 30
40 0	1.69	1.67	1.66	1.64	1.63	1.62	1.61	1.59	1.58	1.56	1.55	1.54	40 0
30 30	1.66	1.65	1.64	1.62	1.61	1.60	1.59	1.57	1.56	1.54	1.53	1.52	30 30
41 0	1.64	1.63	1.62	1.60	1.59	1.58	1.57	1.55	1.54	1.53	1.52	1.50	41 0
30 30	1.62	1.61	1.60	1.58	1.57	1.56	1.55	1.54	1.52	1.51	1.50	1.48	30 30
42 0	1.60	1.59	1.58	1.56	1.55	1.54	1.53	1.52	1.51	1.50	1.48	1.47	42 0
30 30	1.58	1.57	1.56	1.54	1.53	1.52	1.51	1.50	1.49	1.48	1.46	1.45	30 30
43 0	1.56	1.55	1.54	1.52	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.44	43 0
30 30	1.54	1.53	1.52	1.51	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.42	30 30
44 0	1.52	1.51	1.50	1.49	1.48	1.46	1.45	1.44	1.43	1.42	1.41	1.40	44 0
30 30	1.50	1.49	1.48	1.47	1.46	1.45	1.43	1.42	1.41	1.41	1.39	1.38	30 30
45 0	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	45 0
30 30	1.46	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	30 30
46 0	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34	1.33	46 0
30 30	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34	1.33	1.33	1.31	30 30
47 0	1.40	1.39	1.39	1.38	1.37	1.36	1.35	1.34	1.33	1.32	1.31	1.30	47 0
30 30	1.38	1.38	1.37	1.36	1.35	1.34	1.33	1.32	1.31	1.30	1.29	1.28	30 30
48 0	1.37	1.36	1.35	1.34	1.33	1.32	1.31	1.30	1.30	1.29	1.28	1.27	48 0
30 30	1.35	1.34	1.33	1.32	1.31	1.30	1.29	1.29	1.28	1.27	1.26	1.25	30 30
49 0	1.33	1.32	1.31	1.30	1.30	1.29	1.28	1.27	1.26	1.25	1.25	1.24	49 0
30 30	1.31	1.30	1.29	1.29	1.28	1.27	1.26	1.25	1.24	1.24	1.23	1.22	30 30
50 0	1.29	1.28	1.28	1.27	1.26	1.25	1.25	1.24	1.23	1.22	1.21	1.20	50 0
30 30	1.27	1.27	1.26	1.25	1.24	1.24	1.23	1.22	1.21	1.21	1.19	1.18	30 30
51 0	1.26	1.25	1.24	1.23	1.23	1.22	1.21	1.20	1.20	1.19	1.18	1.17	51 0
30 30	1.24	1.23	1.22	1.22	1.21	1.20	1.19	1.19	1.18	1.17	1.16	1.15	30 30
52 0	1.22	1.21	1.21	1.20	1.19	1.18	1.18	1.17	1.17	1.16	1.15	1.14	52 0
30 30	1.20	1.20	1.19	1.18	1.17	1.17	1.16	1.16	1.15	1.14	1.14	1.12	30 30
53 0	1.19	1.18	1.17	1.16	1.16	1.15	1.15	1.14	1.13	1.13	1.12	1.11	53 0
30 30	1.17	1.16	1.15	1.15	1.14	1.14	1.13	1.12	1.11	1.11	1.10	1.10	30 30
54 0	1.15	1.14	1.14	1.13	1.13	1.12	1.12	1.11	1.11	1.10	1.09	1.08	54 0
30 30	1.13	1.13	1.12	1.12	1.11	1.11	1.10	1.09	1.08	1.08	1.07	1.07	30 30
55 0	1.12	1.11	1.11	1.10	1.10	1.09	1.08	1.07	1.07	1.06	1.06	1.05	55 0
30 30	1.10	1.10	1.09	1.08	1.08	1.07	1.06	1.06	1.05	1.05	1.04	1.04	30 30
56 0	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.02	56 0
30 30	1.07	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.01	1.01	30 30
57 0	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.01	1.01	1.00	1.00	0.99	57 0
30 30	1.03	1.03	1.02	1.02	1.01	1.01	1.00	1.00	0.99	0.99	0.98	0.98	30 30
58 0	1.02	1.01	1.01	1.00	1.00	0.99	0.99	0.98	0.98	0.97	0.97	0.96	58 0
30 30	1.00	1.00	0.99	0.99	0.98	0.98	0.97	0.97	0.96	0.96	0.95	0.95	30 30
59 0	0.99	0.98	0.98	0.97	0.97	0.96	0.96	0.95	0.95	0.94	0.94	0.93	59 0
30 30	0.97	0.97	0.96	0.96	0.95	0.95	0.94	0.94	0.93	0.93	0.92	0.92	30 30
60 0	0.95	0.95	0.95	0.94	0.94	0.93	0.93	0.93	0.92	0.91	0.91	0.90	60 0

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to</i> —LATITUDE.											Latitude.	
	24	24 30	25	26	27	28	29	30	31	32	33		34
0	"	"	"	"	"	"	"	"	"	"	"	"	0
1	4.41	4.31	4.21	4.03	3.85	3.69	3.54	3.40	3.27	3.14	3.02	2.91	1
2	4.24	4.15	4.06	3.89	3.73	3.58	3.43	3.30	3.18	3.06	2.94	2.84	2
3	4.09	4.00	3.92	3.76	3.61	3.47	3.33	3.21	3.09	2.98	2.87	2.77	3
4	3.95	3.87	3.79	3.64	3.49	3.36	3.24	3.12	3.01	2.90	2.80	2.70	4
5	3.81	3.73	3.66	3.52	3.39	3.26	3.15	3.03	2.93	2.83	2.73	2.64	5
6	3.69	3.62	3.55	3.41	3.29	3.17	3.06	2.95	2.85	2.76	2.66	2.58	6
7	3.57	3.50	3.44	3.31	3.19	3.08	2.98	2.88	2.78	2.69	2.60	2.52	7
8	3.46	3.39	3.33	3.22	3.11	3.00	2.90	2.80	2.71	2.63	2.54	2.46	8
9	3.35	3.29	3.24	3.13	3.02	2.92	2.83	2.74	2.65	2.57	2.49	2.41	9
10	3.25	3.19	3.14	3.04	2.94	2.85	2.76	2.67	2.59	2.51	2.43	2.36	10
11	3.16	3.11	3.06	2.96	2.86	2.77	2.69	2.61	2.53	2.45	2.38	2.31	11
12	3.07	3.02	2.97	2.88	2.79	2.70	2.62	2.54	2.47	2.40	2.33	2.26	12
13	2.99	2.94	2.89	2.80	2.72	2.64	2.56	2.49	2.41	2.34	2.28	2.21	13
14	2.90	2.86	2.82	2.73	2.65	2.57	2.50	2.43	2.36	2.29	2.23	2.17	14
15	2.83	2.78	2.74	2.66	2.59	2.51	2.44	2.38	2.31	2.25	2.18	2.13	15
16	2.75	2.71	2.67	2.60	2.53	2.46	2.39	2.32	2.26	2.20	2.14	2.08	16
17	2.68	2.64	2.61	2.54	2.47	2.40	2.33	2.27	2.21	2.15	2.10	2.04	17
18	2.61	2.57	2.54	2.47	2.41	2.34	2.28	2.22	2.17	2.11	2.06	2.00	18
19	2.55	2.51	2.48	2.42	2.35	2.29	2.23	2.18	2.12	2.07	2.02	1.96	19
20	2.49	2.45	2.42	2.36	2.30	2.24	2.18	2.13	2.08	2.03	1.98	1.93	20
21	2.43	2.39	2.36	2.31	2.25	2.19	2.14	2.09	2.04	1.99	1.94	1.89	21
22	2.37	2.34	2.31	2.25	2.20	2.14	2.09	2.04	1.99	1.95	1.90	1.86	22
23	2.31	2.28	2.26	2.20	2.15	2.10	2.05	2.00	1.95	1.91	1.86	1.82	23
24	2.26	2.23	2.20	2.15	2.10	2.05	2.01	1.96	1.91	1.87	1.83	1.78	24
25	2.21	2.18	2.15	2.10	2.06	2.01	1.96	1.92	1.88	1.83	1.79	1.75	25
26	2.15	2.13	2.11	2.05	2.01	1.97	1.92	1.88	1.84	1.80	1.76	1.72	26
27	2.10	2.08	2.06	2.01	1.97	1.93	1.88	1.85	1.81	1.76	1.72	1.69	27
28	2.06	2.03	2.01	1.97	1.93	1.89	1.85	1.81	1.77	1.73	1.69	1.66	28
29	2.01	1.98	1.96	1.92	1.89	1.85	1.81	1.77	1.73	1.70	1.66	1.63	29
30	1.96	1.93	1.91	1.88	1.85	1.81	1.77	1.74	1.70	1.67	1.63	1.60	30
31	1.92	1.89	1.87	1.84	1.81	1.77	1.74	1.70	1.66	1.63	1.60	1.57	31
32	1.88	1.85	1.83	1.80	1.77	1.73	1.70	1.66	1.63	1.60	1.57	1.54	32
33	1.83	1.81	1.79	1.76	1.73	1.70	1.67	1.63	1.60	1.57	1.54	1.51	33
34	1.79	1.77	1.75	1.72	1.69	1.66	1.63	1.60	1.57	1.54	1.51	1.48	34
35	1.75	1.73	1.71	1.68	1.65	1.63	1.60	1.57	1.54	1.51	1.48	1.46	35
36	1.71	1.69	1.67	1.65	1.62	1.59	1.57	1.54	1.51	1.48	1.45	1.43	36
37	1.68	1.66	1.64	1.61	1.58	1.56	1.53	1.51	1.48	1.45	1.43	1.40	37
38	1.64	1.62	1.60	1.58	1.55	1.53	1.50	1.48	1.45	1.42	1.40	1.38	38
39	1.60	1.58	1.57	1.54	1.52	1.49	1.47	1.45	1.42	1.40	1.37	1.35	39
40	1.56	1.54	1.53	1.51	1.49	1.46	1.44	1.42	1.39	1.37	1.35	1.33	40
41	1.53	1.51	1.50	1.48	1.46	1.43	1.41	1.39	1.36	1.34	1.32	1.30	41
42	1.49	1.47	1.46	1.44	1.42	1.40	1.38	1.36	1.33	1.31	1.29	1.27	42
43	1.46	1.44	1.43	1.41	1.39	1.37	1.35	1.33	1.31	1.29	1.27	1.24	43
44	1.43	1.41	1.40	1.38	1.36	1.34	1.32	1.30	1.28	1.26	1.24	1.22	44
45	1.39	1.38	1.37	1.35	1.33	1.31	1.29	1.27	1.25	1.23	1.22	1.19	45
46	1.36	1.34	1.33	1.32	1.30	1.28	1.26	1.24	1.22	1.21	1.19	1.17	46
47	1.32	1.31	1.30	1.29	1.27	1.25	1.23	1.21	1.20	1.18	1.17	1.15	47
48	1.29	1.28	1.27	1.26	1.24	1.22	1.20	1.19	1.17	1.16	1.14	1.12	48
49	1.26	1.25	1.24	1.23	1.21	1.20	1.18	1.16	1.14	1.13	1.12	1.10	49
50	1.23	1.22	1.21	1.20	1.18	1.17	1.15	1.13	1.12	1.11	1.09	1.08	50
51	1.20	1.19	1.18	1.16	1.15	1.14	1.12	1.11	1.09	1.08	1.06	1.05	51
52	1.17	1.16	1.15	1.13	1.12	1.11	1.10	1.08	1.06	1.06	1.04	1.03	52
53	1.14	1.13	1.12	1.10	1.09	1.08	1.07	1.05	1.04	1.03	1.02	1.00	53
54	1.11	1.10	1.09	1.07	1.06	1.06	1.04	1.03	1.01	1.01	0.99	0.98	54
55	1.08	1.07	1.06	1.04	1.03	1.03	1.02	1.00	0.99	0.98	0.97	0.96	55
56	1.05	1.04	1.03	1.02	1.01	1.00	0.99	0.98	0.97	0.96	0.94	0.93	56
57	1.02	1.01	1.00	0.99	0.98	0.97	0.97	0.95	0.94	0.93	0.92	0.91	57
58	0.99	0.98	0.97	0.96	0.95	0.95	0.94	0.93	0.92	0.91	0.89	0.88	58
59	0.96	0.95	0.95	0.94	0.93	0.92	0.91	0.90	0.89	0.88	0.86	0.86	59
60	0.93	0.92	0.92	0.91	0.90	0.89	0.89	0.88	0.87	0.86	0.85	0.84	60
60	0.90	0.89	0.89	0.88	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	60

Below  for altitudes near the inferior meridian.

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to</i> —LATITUDE.											Latitude.	
	35	36	37	38	39	40	41	42	43	44	45		46
0	2.80	2.70	2.61	2.51	2.42	2.34	2.26	2.18	2.10	2.03	1.96	1.90	0
1	2.74	2.64	2.55	2.46	2.37	2.29	2.21	2.14	2.07	2.00	1.93	1.86	1
2	2.67	2.58	2.49	2.41	2.32	2.25	2.17	2.10	2.03	1.96	1.90	1.83	2
3	2.61	2.52	2.44	2.36	2.28	2.20	2.13	2.06	1.99	1.93	1.87	1.80	3
4	2.55	2.47	2.38	2.31	2.23	2.16	2.09	2.02	1.96	1.90	1.84	1.78	4
5	2.49	2.41	2.33	2.26	2.19	2.12	2.05	1.99	1.92	1.86	1.81	1.75	5
6	2.44	2.36	2.29	2.22	2.15	2.08	2.01	1.95	1.89	1.83	1.78	1.72	6
7	2.39	2.31	2.24	2.17	2.11	2.04	1.97	1.92	1.86	1.80	1.75	1.70	7
8	2.34	2.26	2.20	2.13	2.07	2.00	1.94	1.89	1.83	1.77	1.72	1.67	8
9	2.29	2.22	2.15	2.09	2.03	1.97	1.91	1.85	1.80	1.75	1.70	1.64	9
10	2.24	2.17	2.11	2.05	1.99	1.93	1.87	1.82	1.77	1.72	1.67	1.62	10
11	2.19	2.13	2.07	2.01	1.96	1.90	1.84	1.79	1.74	1.69	1.64	1.60	11
12	2.15	2.09	2.03	1.98	1.92	1.87	1.81	1.76	1.71	1.67	1.62	1.57	12
13	2.11	2.05	1.99	1.94	1.89	1.83	1.78	1.74	1.69	1.64	1.60	1.55	13
14	2.07	2.01	1.96	1.91	1.85	1.80	1.75	1.71	1.66	1.62	1.57	1.53	14
15	2.03	1.97	1.92	1.87	1.82	1.77	1.72	1.68	1.63	1.59	1.55	1.51	15
16	1.99	1.94	1.89	1.84	1.79	1.74	1.69	1.65	1.61	1.57	1.53	1.48	16
17	1.95	1.90	1.85	1.81	1.76	1.71	1.67	1.63	1.58	1.54	1.50	1.46	17
18	1.92	1.87	1.82	1.77	1.73	1.69	1.64	1.60	1.56	1.52	1.48	1.44	18
19	1.88	1.83	1.79	1.74	1.70	1.66	1.62	1.58	1.54	1.50	1.46	1.42	19
20	1.85	1.80	1.76	1.71	1.67	1.63	1.59	1.55	1.51	1.48	1.44	1.40	20
21	1.81	1.77	1.73	1.69	1.64	1.60	1.56	1.53	1.49	1.45	1.42	1.38	21
22	1.78	1.74	1.70	1.66	1.62	1.58	1.54	1.50	1.47	1.43	1.40	1.36	22
23	1.75	1.71	1.67	1.63	1.59	1.55	1.51	1.48	1.44	1.41	1.38	1.34	23
24	1.71	1.68	1.64	1.60	1.56	1.53	1.49	1.46	1.42	1.39	1.36	1.33	24
25	1.68	1.64	1.60	1.58	1.54	1.50	1.47	1.44	1.40	1.37	1.34	1.31	25
26	1.65	1.61	1.58	1.55	1.51	1.48	1.45	1.41	1.38	1.35	1.32	1.29	26
27	1.62	1.58	1.55	1.52	1.49	1.46	1.42	1.39	1.36	1.33	1.30	1.27	27
28	1.59	1.56	1.53	1.50	1.46	1.43	1.40	1.37	1.34	1.31	1.28	1.25	28
29	1.57	1.53	1.50	1.47	1.44	1.41	1.38	1.35	1.32	1.29	1.26	1.23	29
30	1.54	1.51	1.48	1.45	1.42	1.39	1.36	1.33	1.30	1.27	1.24	1.22	30
31	1.51	1.48	1.45	1.42	1.40	1.36	1.33	1.31	1.28	1.26	1.23	1.20	31
32	1.48	1.45	1.42	1.40	1.37	1.34	1.31	1.29	1.26	1.24	1.21	1.18	32
33	1.46	1.43	1.40	1.37	1.35	1.32	1.29	1.27	1.24	1.22	1.19	1.17	33
34	1.43	1.40	1.38	1.35	1.33	1.30	1.27	1.25	1.22	1.20	1.18	1.15	34
35	1.40	1.38	1.35	1.33	1.30	1.27	1.25	1.23	1.20	1.18	1.16	1.14	35
36	1.38	1.35	1.33	1.30	1.28	1.25	1.23	1.21	1.19	1.17	1.14	1.12	36
37	1.35	1.33	1.30	1.28	1.25	1.23	1.21	1.19	1.17	1.15	1.12	1.10	37
38	1.33	1.30	1.28	1.26	1.24	1.21	1.19	1.17	1.15	1.13	1.11	1.08	38
39	1.30	1.29	1.27	1.23	1.22	1.19	1.17	1.15	1.13	1.11	1.09	1.07	39
40	1.28	1.26	1.24	1.21	1.19	1.17	1.15	1.13	1.11	1.09	1.07	1.05	40
41	1.25	1.23	1.21	1.19	1.17	1.15	1.13	1.11	1.09	1.07	1.05	1.03	41
42	1.23	1.21	1.19	1.17	1.15	1.13	1.11	1.09	1.07	1.05	1.03	1.01	42
43	1.20	1.19	1.17	1.15	1.13	1.11	1.09	1.07	1.05	1.03	1.01	1.00	43
44	1.18	1.17	1.15	1.12	1.11	1.09	1.07	1.05	1.03	1.01	1.00	0.98	44
45	1.15	1.14	1.12	1.10	1.08	1.07	1.05	1.03	1.01	1.00	0.98	0.96	45
46	1.13	1.12	1.10	1.08	1.06	1.05	1.03	1.01	1.00	0.98	0.96	0.95	46
47	1.11	1.10	1.08	1.06	1.04	1.03	1.01	1.00	0.98	0.96	0.95	0.93	47
48	1.08	1.07	1.05	1.04	1.02	1.01	0.99	0.98	0.96	0.94	0.93	0.92	48
49	1.06	1.05	1.03	1.02	1.00	0.99	0.97	0.96	0.94	0.93	0.92	0.90	49
50	1.04	1.03	1.01	0.99	0.98	0.97	0.95	0.94	0.93	0.91	0.90	0.88	50
51	1.01	1.00	0.98	0.97	0.96	0.95	0.93	0.92	0.91	0.89	0.88	0.86	51
52	0.99	0.98	0.96	0.95	0.94	0.93	0.91	0.90	0.88	0.87	0.86	0.85	52
53	0.97	0.96	0.94	0.93	0.92	0.91	0.90	0.88	0.87	0.86	0.84	0.83	53
54	0.94	0.93	0.92	0.91	0.90	0.89	0.88	0.86	0.85	0.84	0.83	0.81	54
55	0.92	0.91	0.90	0.89	0.88	0.87	0.85	0.84	0.83	0.82	0.81	0.79	55
56	0.90	0.89	0.88	0.87	0.86	0.84	0.83	0.82	0.81	0.80	0.79	0.78	56
57	0.87	0.87	0.86	0.84	0.83	0.82	0.81	0.80	0.79	0.78	0.77	0.76	57
58	0.85	0.84	0.83	0.82	0.81	0.80	0.79	0.78	0.77	0.76	0.76	0.75	58
59	0.83	0.82	0.81	0.80	0.79	0.78	0.78	0.77	0.76	0.75	0.74	0.73	59
60	0.80	0.79	0.79	0.78	0.77	0.77	0.76	0.75	0.74	0.73	0.72	0.71	60

Below  for altitudes near the inferior meridian.

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to</i> —LATITUDE.												Latitude.	
	47	48	49	50	51	52	53	54	55	56	57	58		
0	1.83	"	1.71	1.65	"	1.59	1.53	1.48	1.43	1.37	1.32	1.28	1.23	0
1	1.80	1.74	1.68	1.62	1.56	1.51	1.46	1.41	1.36	1.31	1.26	1.21	1.16	1
2	1.77	1.71	1.66	1.60	1.54	1.49	1.44	1.39	1.34	1.29	1.25	1.20	1.15	2
3	1.75	1.69	1.63	1.58	1.52	1.47	1.42	1.37	1.32	1.28	1.23	1.19	1.14	3
4	1.72	1.66	1.61	1.56	1.50	1.45	1.41	1.36	1.31	1.26	1.22	1.18	1.14	4
5	1.69	1.64	1.59	1.53	1.48	1.44	1.39	1.34	1.29	1.25	1.21	1.16	1.12	5
6	1.67	1.62	1.56	1.51	1.46	1.42	1.37	1.32	1.28	1.24	1.19	1.15	1.11	6
7	1.64	1.59	1.54	1.49	1.44	1.40	1.35	1.31	1.26	1.22	1.18	1.14	1.10	7
8	1.62	1.57	1.52	1.47	1.42	1.38	1.34	1.29	1.25	1.21	1.17	1.13	1.09	8
9	1.60	1.55	1.50	1.45	1.41	1.37	1.32	1.28	1.24	1.20	1.16	1.12	1.08	9
10	1.57	1.53	1.48	1.44	1.39	1.35	1.31	1.26	1.22	1.18	1.14	1.11	1.07	10
11	1.55	1.50	1.46	1.42	1.37	1.33	1.29	1.25	1.21	1.17	1.13	1.09	1.05	11
12	1.53	1.48	1.44	1.40	1.36	1.32	1.28	1.24	1.20	1.16	1.12	1.08	1.04	12
13	1.51	1.46	1.42	1.38	1.34	1.30	1.25	1.22	1.18	1.15	1.11	1.07	1.03	13
14	1.49	1.44	1.40	1.36	1.32	1.28	1.25	1.21	1.17	1.13	1.10	1.06	1.02	14
15	1.46	1.42	1.38	1.35	1.31	1.27	1.23	1.19	1.15	1.12	1.09	1.05	1.01	15
16	1.44	1.41	1.37	1.33	1.29	1.25	1.22	1.18	1.14	1.11	1.07	1.04	1.00	16
17	1.42	1.39	1.35	1.31	1.27	1.24	1.20	1.17	1.13	1.10	1.06	1.03	0.99	17
18	1.40	1.37	1.33	1.29	1.26	1.22	1.19	1.15	1.12	1.09	1.05	1.02	0.98	18
19	1.39	1.35	1.31	1.28	1.24	1.21	1.17	1.14	1.10	1.07	1.04	1.01	0.97	19
20	1.37	1.33	1.30	1.26	1.23	1.19	1.16	1.13	1.09	1.06	1.03	1.00	0.96	20
21	1.35	1.31	1.28	1.25	1.21	1.18	1.15	1.11	1.08	1.05	1.02	0.99	0.95	21
22	1.33	1.30	1.26	1.23	1.20	1.17	1.13	1.10	1.07	1.04	1.01	0.98	0.94	22
23	1.31	1.28	1.25	1.21	1.18	1.15	1.12	1.09	1.06	1.03	1.00	0.97	0.93	23
24	1.29	1.26	1.23	1.20	1.17	1.14	1.11	1.08	1.05	1.02	0.99	0.96	0.92	24
25	1.28	1.24	1.22	1.19	1.16	1.13	1.10	1.07	1.04	1.01	0.98	0.95	0.91	25
26	1.26	1.23	1.20	1.17	1.14	1.11	1.08	1.05	1.02	1.00	0.97	0.94	0.90	26
27	1.24	1.21	1.18	1.16	1.13	1.10	1.07	1.04	1.01	0.99	0.96	0.93	0.89	27
28	1.22	1.20	1.17	1.14	1.11	1.09	1.06	1.03	1.00	0.98	0.95	0.92	0.88	28
29	1.21	1.18	1.15	1.13	1.10	1.07	1.04	1.02	0.99	0.96	0.94	0.91	0.87	29
30	1.19	1.16	1.14	1.11	1.08	1.06	1.03	1.00	0.97	0.95	0.93	0.90	0.86	30
31	1.17	1.15	1.12	1.10	1.07	1.04	1.02	0.99	0.96	0.94	0.92	0.89	0.85	31
32	1.16	1.13	1.11	1.09	1.06	1.03	1.01	0.98	0.95	0.93	0.91	0.88	0.84	32
33	1.14	1.12	1.09	1.07	1.05	1.02	1.00	0.97	0.94	0.92	0.89	0.86	0.82	33
34	1.13	1.10	1.08	1.06	1.03	1.01	0.98	0.96	0.93	0.91	0.88	0.86	0.82	34
35	1.11	1.09	1.07	1.04	1.02	1.00	0.97	0.94	0.92	0.90	0.87	0.85	0.81	35
36	1.10	1.07	1.05	1.03	1.00	0.98	0.96	0.93	0.91	0.89	0.87	0.84	0.81	36
37	1.08	1.05	1.03	1.01	0.98	0.96	0.94	0.92	0.90	0.88	0.86	0.83	0.80	37
38	1.06	1.04	1.02	0.99	0.97	0.95	0.93	0.91	0.89	0.87	0.84	0.82	0.79	38
39	1.05	1.02	1.00	0.98	0.96	0.94	0.92	0.90	0.88	0.86	0.83	0.81	0.78	39
40	1.03	1.01	0.99	0.97	0.95	0.93	0.91	0.89	0.87	0.84	0.82	0.80	0.77	40
41	1.01	0.99	0.97	0.95	0.93	0.91	0.90	0.88	0.85	0.83	0.81	0.79	0.76	41
42	1.00	0.98	0.96	0.94	0.92	0.90	0.88	0.86	0.84	0.82	0.80	0.78	0.75	42
43	0.98	0.96	0.94	0.93	0.91	0.88	0.87	0.85	0.83	0.81	0.79	0.77	0.74	43
44	0.96	0.94	0.93	0.91	0.89	0.87	0.86	0.84	0.82	0.80	0.78	0.76	0.73	44
45	0.95	0.93	0.92	0.90	0.88	0.86	0.84	0.83	0.81	0.79	0.77	0.76	0.73	45
46	0.93	0.92	0.90	0.88	0.86	0.85	0.83	0.81	0.79	0.78	0.76	0.75	0.72	46
47	0.92	0.90	0.88	0.86	0.85	0.83	0.82	0.80	0.78	0.77	0.75	0.74	0.71	47
48	0.90	0.88	0.87	0.85	0.84	0.82	0.81	0.79	0.77	0.75	0.74	0.73	0.70	48
49	0.88	0.87	0.86	0.84	0.82	0.80	0.80	0.78	0.75	0.74	0.73	0.72	0.69	49
50	0.86	0.85	0.84	0.82	0.80	0.79	0.78	0.76	0.74	0.73	0.72	0.71	0.68	50
51	0.85	0.84	0.82	0.80	0.79	0.78	0.76	0.75	0.73	0.72	0.71	0.70	0.67	51
52	0.83	0.82	0.80	0.79	0.78	0.77	0.75	0.74	0.72	0.71	0.70	0.69	0.66	52
53	0.82	0.81	0.79	0.78	0.76	0.75	0.74	0.72	0.71	0.70	0.69	0.67	0.64	53
54	0.80	0.79	0.78	0.76	0.75	0.74	0.72	0.71	0.69	0.69	0.67	0.66	0.63	54
55	0.78	0.77	0.75	0.74	0.73	0.72	0.71	0.70	0.69	0.68	0.67	0.65	0.62	55
56	0.77	0.75	0.74	0.73	0.72	0.71	0.70	0.69	0.67	0.66	0.65	0.63	0.60	56
57	0.75	0.74	0.73	0.72	0.71	0.70	0.69	0.67	0.66	0.65	0.63	0.62	0.59	57
58	0.74	0.73	0.72	0.71	0.70	0.69	0.67	0.66	0.65	0.63	0.62	0.61	0.58	58
59	0.72	0.71	0.70	0.69	0.68	0.67	0.66	0.64	0.63	0.62	0.61	0.60	0.57	59
60	0.70	0.70	0.69	0.68	0.67	0.66	0.64	0.63	0.62	0.61	0.60	0.59	0.56	60

Below

for altitudes near the inferior meridian.

TABLE III.—VALUES OF C.

Latitude.	DECLINATION— <i>contrary Name to</i> —LATITUDE.												Latitude.
	59	60	61	62	63	64	65	66	67	68	69	70	
0	1.18	1.13	1.09	1.04	1.00	0.96	0.91	0.87	0.83	0.79	0.75	0.71	0
1	1.17	1.12	1.08	1.03	0.99	0.95	0.91	0.87	0.83	0.79	0.75	0.71	1
2	1.16	1.11	1.07	1.02	0.98	0.94	0.90	0.86	0.82	0.78	0.74	0.71	2
3	1.14	1.10	1.06	1.02	0.97	0.93	0.89	0.85	0.81	0.78	0.74	0.70	3
4	1.13	1.09	1.05	1.01	0.97	0.93	0.89	0.85	0.81	0.77	0.73	0.70	4
5	1.12	1.08	1.04	1.00	0.96	0.92	0.88	0.84	0.80	0.77	0.73	0.69	5
6	1.11	1.07	1.03	0.99	0.95	0.91	0.87	0.83	0.80	0.76	0.72	0.69	6
7	1.10	1.06	1.02	0.98	0.94	0.90	0.85	0.83	0.79	0.75	0.71	0.68	7
8	1.09	1.05	1.01	0.97	0.93	0.90	0.86	0.82	0.78	0.75	0.71	0.68	8
9	1.08	1.04	1.00	0.96	0.93	0.89	0.85	0.82	0.78	0.74	0.71	0.68	9
10	1.07	1.03	0.99	0.95	0.92	0.88	0.84	0.81	0.77	0.74	0.70	0.67	10
11	1.06	1.02	0.98	0.95	0.91	0.87	0.84	0.80	0.77	0.73	0.70	0.67	11
12	1.05	1.01	0.97	0.94	0.90	0.87	0.83	0.80	0.76	0.73	0.69	0.66	12
13	1.04	1.00	0.96	0.93	0.90	0.86	0.83	0.79	0.76	0.73	0.69	0.66	13
14	1.03	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.75	0.72	0.68	0.65	14
15	1.02	0.98	0.95	0.91	0.88	0.85	0.81	0.78	0.74	0.71	0.68	0.65	15
16	1.01	0.97	0.94	0.91	0.87	0.84	0.80	0.77	0.74	0.71	0.68	0.65	16
17	1.00	0.96	0.93	0.90	0.87	0.83	0.80	0.77	0.73	0.70	0.67	0.64	17
18	0.99	0.95	0.92	0.89	0.86	0.83	0.79	0.76	0.73	0.70	0.67	0.64	18
19	0.98	0.95	0.91	0.88	0.85	0.82	0.79	0.76	0.72	0.69	0.66	0.63	19
20	0.97	0.94	0.91	0.87	0.84	0.81	0.78	0.75	0.72	0.69	0.66	0.63	20
21	0.96	0.93	0.90	0.87	0.84	0.81	0.78	0.75	0.71	0.68	0.65	0.62	21
22	0.95	0.92	0.89	0.86	0.83	0.80	0.77	0.74	0.71	0.68	0.65	0.62	22
23	0.94	0.91	0.88	0.85	0.82	0.79	0.77	0.74	0.70	0.67	0.64	0.61	23
24	0.93	0.90	0.87	0.84	0.82	0.79	0.76	0.73	0.70	0.67	0.64	0.61	24
25	0.92	0.89	0.86	0.84	0.81	0.78	0.76	0.73	0.69	0.66	0.63	0.61	25
26	0.91	0.88	0.86	0.83	0.80	0.77	0.75	0.72	0.69	0.66	0.63	0.61	26
27	0.90	0.88	0.85	0.82	0.79	0.77	0.75	0.72	0.68	0.65	0.62	0.60	27
28	0.89	0.87	0.84	0.81	0.79	0.76	0.74	0.71	0.68	0.65	0.62	0.60	28
29	0.88	0.86	0.83	0.80	0.78	0.75	0.73	0.70	0.67	0.64	0.61	0.59	29
30	0.87	0.85	0.82	0.80	0.77	0.75	0.72	0.69	0.67	0.64	0.61	0.59	30
31	0.86	0.84	0.82	0.79	0.76	0.74	0.72	0.69	0.66	0.63	0.61	0.59	31
32	0.85	0.83	0.81	0.78	0.76	0.73	0.71	0.68	0.66	0.63	0.60	0.58	32
33	0.84	0.82	0.80	0.77	0.75	0.72	0.70	0.68	0.66	0.62	0.60	0.58	33
34	0.84	0.81	0.79	0.76	0.74	0.72	0.69	0.67	0.65	0.62	0.60	0.57	34
35	0.83	0.80	0.78	0.75	0.74	0.71	0.69	0.67	0.64	0.61	0.59	0.57	35
36	0.82	0.79	0.77	0.75	0.73	0.71	0.68	0.66	0.63	0.61	0.59	0.56	36
37	0.81	0.79	0.77	0.74	0.73	0.70	0.68	0.65	0.62	0.60	0.58	0.56	37
38	0.80	0.78	0.76	0.74	0.72	0.69	0.67	0.65	0.62	0.60	0.58	0.56	38
39	0.79	0.77	0.76	0.73	0.71	0.69	0.66	0.64	0.61	0.59	0.57	0.55	39
40	0.78	0.77	0.75	0.72	0.70	0.68	0.66	0.64	0.61	0.59	0.57	0.55	40
41	0.78	0.76	0.74	0.71	0.69	0.67	0.65	0.63	0.60	0.58	0.56	0.54	41
42	0.77	0.75	0.73	0.70	0.68	0.66	0.64	0.62	0.60	0.58	0.56	0.54	42
43	0.76	0.74	0.72	0.69	0.67	0.65	0.63	0.61	0.59	0.57	0.55	0.53	43
44	0.75	0.73	0.71	0.68	0.67	0.65	0.63	0.61	0.59	0.57	0.55	0.53	44
45	0.74	0.72	0.70	0.68	0.66	0.64	0.62	0.60	0.58	0.56	0.54	0.52	45
46	0.73	0.71	0.69	0.67	0.65	0.64	0.62	0.60	0.58	0.56	0.54	0.52	46
47	0.72	0.70	0.69	0.66	0.64	0.63	0.61	0.59	0.57	0.55	0.53	0.51	47
48	0.71	0.70	0.68	0.65	0.63	0.62	0.60	0.58	0.57	0.55	0.53	0.51	48
49	0.70	0.69	0.67	0.64	0.63	0.61	0.59	0.57	0.56	0.54	0.52	0.50	49
50	0.69	0.68	0.66	0.64	0.62	0.61	0.59	0.57	0.56	0.54	0.52	0.50	50
51	0.68	0.67	0.65	0.63	0.61	0.60	0.58	0.56	0.55	0.53	0.51	0.49	51
52	0.67	0.66	0.64	0.62	0.60	0.59	0.57	0.56	0.54	0.52	0.51	0.49	52
53	0.66	0.64	0.63	0.61	0.59	0.58	0.56	0.55	0.54	0.52	0.50	0.48	53
54	0.64	0.63	0.62	0.60	0.58	0.57	0.55	0.54	0.53	0.51	0.49	0.47	54
55	0.63	0.62	0.61	0.59	0.57	0.56	0.54	0.53	0.52	0.50	0.48	0.46	55
56	0.62	0.61	0.60	0.58	0.57	0.56	0.54	0.53	0.51	0.49	0.47	0.46	56
57	0.61	0.60	0.59	0.57	0.56	0.55	0.53	0.52	0.50	0.48	0.46	0.45	57
58	0.60	0.59	0.58	0.57	0.55	0.54	0.52	0.51	0.49	0.48	0.46	0.45	58
59	0.59	0.58	0.57	0.56	0.54	0.53	0.51	0.50	0.48	0.47	0.45	0.44	59
60	0.58	0.57	0.56	0.55	0.53	0.52	0.50	0.49	0.47	0.46	0.45	0.44	60

Below _____ for altitudes near the inferior meridian.

TABLE IV.—VALUES OF Ch^2 .

C.	HOUR ANGLE.												C.	
	m. s. 0 30	m. s. 1 0	m. s. 1 30	m. s. 2 0	m. s. 2 30	m. s. 3 0	m. s. 3 30	m. s. 4 0	m. s. 4 30	m. s. 5 0	m. s. 5 30	m. s. 6 0		
.1	0 0	0 0	0 0	0 0	0 1	0 1	0 1	0 2	0 2	0 2	0 3	0 4	0 4	.1
.2	0 0	0 0	0 0	0 1	0 1	0 1	0 2	0 3	0 3	0 4	0 5	0 6	0 7	.2
.3	0 0	0 0	0 1	0 1	0 2	0 2	0 3	0 4	0 5	0 6	0 7	0 8	0 9	.3
.4	0 0	0 0	0 1	0 2	0 2	0 3	0 4	0 5	0 6	0 8	0 10	0 12	0 14	.4
.5	0 0	0 0	0 1	0 2	0 3	0 3	0 4	0 6	0 8	0 10	0 12	0 15	0 18	.5
.6	0 0	0 1	0 1	0 2	0 4	0 4	0 5	0 7	0 10	0 12	0 15	0 18	0 22	.6
.7	0 0	0 1	0 2	0 3	0 4	0 6	0 9	0 11	0 14	0 17	0 21	0 25	0 29	.7
.8	0 0	0 1	0 2	0 3	0 5	0 7	0 10	0 13	0 16	0 20	0 24	0 29	0 32	.8
.9	0 0	0 1	0 2	0 4	0 6	0 8	0 11	0 14	0 18	0 22	0 27	0 32	0 36	.9
1.	0 0	0 1	0 2	0 4	0 6	0 9	0 12	0 16	0 20	0 25	0 30	0 36	0 41	1.
2.	0 0	0 2	0 4	0 8	0 12	0 18	0 24	0 32	0 41	0 50	1 0	1 12	1 18	2.
3.	0 1	0 3	0 7	0 12	0 19	0 27	0 37	0 48	1 1	1 15	1 31	1 48	2 0	3.
4.	0 1	0 4	0 9	0 16	0 25	0 36	0 49	1 4	1 21	1 40	2 1	2 24	2 42	4.
5.	0 1	0 5	0 11	0 20	0 31	0 45	1 1	1 20	1 41	2 5	2 31	3 0	3 36	5.
6.	0 1	0 6	0 13	0 24	0 37	0 54	1 13	1 36	2 1	2 30	3 1	3 36	4 0	6.
7.	0 2	0 7	0 16	0 28	0 44	1 3	1 26	1 52	2 22	2 55	3 32	4 12	5 0	7.
8.	0 2	0 8	0 18	0 32	0 50	1 12	1 38	2 8	2 42	3 20	4 2	4 48	5 24	8.
9.	0 2	0 9	0 20	0 36	0 56	1 21	1 50	2 24	3 2	3 45	4 32	5 24	6 12	9.
10.	0 2	0 10	0 22	0 40	1 2	1 30	2 3	2 40	3 23	4 10	5 2	6 0	7 0	10.
11.	0 3	0 11	0 25	0 44	1 9	1 39	2 15	2 56	3 43	4 35	5 32	6 36	7 12	11.
12.	0 3	0 12	0 27	0 48	1 15	1 48	2 27	3 12	4 3	5 0	6 3	7 12	8 0	12.
13.	0 3	0 13	0 29	0 52	1 21	1 57	2 39	3 28	4 23	5 25	6 33	7 48	8 24	13.
14.	0 3	0 14	0 31	0 56	1 27	2 6	2 51	3 44	4 43	5 50	7 4	8 24	9 0	14.
15.	0 4	0 15	0 34	1 0	1 34	2 15	3 4	4 0	5 3	6 15	7 34	9 0	10 0	15.
16.	0 4	0 16	0 36	1 4	1 40	2 24	3 16	4 16	5 24	6 40	8 4	9 36	10 12	16.
17.	0 4	0 17	0 38	1 8	1 46	2 33	3 28	4 32	5 44	7 5	8 34	10 12	11 0	17.
18.	0 4	0 18	0 40	1 12	1 52	2 42	3 40	4 48	6 4	7 30	9 4	10 48	11 24	18.
19.	0 5	0 19	0 43	1 16	1 59	2 51	3 53	5 4	6 25	7 55	9 35	11 24	12 12	19.
20.	0 5	0 20	0 45	1 20	2 5	3 0	4 5	5 20	6 45	8 20	10 5	12 0	13 0	20.
21.	0 5	0 21	0 47	1 24	2 11	3 9	4 17	5 36	7 5	8 45	10 35	12 36	14 0	21.
22.	0 5	0 22	0 49	1 28	2 17	3 18	4 30	5 52	7 25	9 10	11 5	13 12	15 0	22.
23.	0 6	0 23	0 52	1 32	2 24	3 27	4 42	6 8	7 46	9 35	11 36	13 48	15 12	23.
24.	0 6	0 24	0 54	1 36	2 30	3 36	4 54	6 24	8 6	10 0	12 6	14 24	16 0	24.
25.	0 6	0 25	0 56	1 40	2 36	3 45	5 6	6 40	8 26	10 25	12 36	15 0	16 12	25.
26.	0 6	0 26	0 58	1 44	2 42	3 54	5 18	6 56	8 46	10 50	13 6	15 36	17 0	26.
27.	0 7	0 27	1 1	1 48	2 49	4 3	5 30	7 12	9 7	11 15	13 37	16 12	18 0	27.
28.	0 7	0 28	1 3	1 52	2 55	4 12	5 43	7 28	9 27	11 40	14 7	16 48	18 12	28.
29.	0 7	0 29	1 5	1 56	3 1	4 21	5 55	7 44	9 47	12 5	14 37	17 24	19 0	29.
30.	0 7	0 30	1 7	2 0	3 7	4 30	6 8	8 0	10 7	12 30	15 7	18 0	20 0	30.
31.	0 8	0 31	1 10	2 4	3 14	4 39	6 20	8 16	10 28	12 55	15 37	18 36	21 0	31.
32.	0 8	0 32	1 12	2 8	3 20	4 48	6 32	8 32	10 48	13 20	16 7	19 12	22 0	32.
33.	0 8	0 33	1 14	2 12	3 26	4 57	6 44	8 48	11 8	13 45	16 38	19 48	22 12	33.
34.	0 8	0 34	1 16	2 16	3 32	5 6	6 56	9 4	11 28	14 10	17 8	20 24	23 0	34.
35.	0 9	0 35	1 19	2 20	3 39	5 15	7 9	9 20	11 49	14 35	17 38	21 0	24 0	35.
36.	0 9	0 36	1 21	2 24	3 45	5 24	7 21	9 36	12 9	15 0	18 8	21 36	24 12	36.
37.	0 9	0 37	1 23	2 28	3 51	5 33	7 33	9 52	12 29	15 25	18 39	22 12	25 0	37.
38.	0 9	0 38	1 25	2 32	3 57	5 42	7 45	10 8	12 50	15 50	19 9	22 48	25 12	38.
39.	0 10	0 39	1 28	2 36	4 4	5 51	7 58	10 24	13 10	16 15	19 39	23 24	26 0	39.
40.	0 10	0 40	30	2 40	4 10	6 0	8 10	10 40	13 30	16 40	20 10	24 0	27 0	40.

TABLE IV.—VALUES OF Ch².

C.	HOUR ANGLE												C.
	m. s. 24 30	m. s. 25 0	m. s. 25 30	m. s. 26 0	m. s. 26 30	m. s. 27 0	m. s. 27 30	m. s. 28 0	m. s. 28 30	m. s. 29 0	m. s. 29 30	m. s. 30 0	
.01	0 6	0 6	0 7	0 7	0 7	0 7	0 8	0 8	0 8	0 8	0 9	0 9	.01
.02	0 12	0 12	0 13	0 14	0 14	0 15	0 15	0 16	0 16	0 17	0 17	0 18	.02
.03	0 18	0 19	0 20	0 20	0 21	0 22	0 23	0 24	0 24	0 25	0 26	0 27	.03
.04	0 24	0 25	0 26	0 27	0 28	0 29	0 30	0 31	0 32	0 34	0 35	0 36	.04
.05	0 30	0 31	0 33	0 34	0 35	0 36	0 38	0 39	0 41	0 42	0 44	0 45	.05
.06	0 36	0 37	0 39	0 41	0 42	0 44	0 45	0 47	0 49	0 50	0 52	0 54	.06
.07	0 42	0 44	0 46	0 47	0 49	0 51	0 53	0 55	0 57	0 59	1 1	1 3	.07
.08	0 48	0 50	0 52	0 54	0 56	0 58	1 0	1 3	1 5	1 7	1 10	1 12	.08
.09	0 54	0 56	0 59	1 1	1 3	1 6	1 8	1 11	1 13	1 16	1 18	1 21	.09
.1	1 0	1 2	1 6	1 8	1 10	1 13	1 16	1 18	1 21	1 24	1 27	1 30	.1
.2	2 0	2 5	2 10	2 15	2 20	2 26	2 31	2 37	2 42	2 48	2 54	3 0	.2
.3	3 0	3 7	3 15	3 23	3 31	3 39	3 47	3 55	4 4	4 12	4 21	4 30	.3
.4	4 0	4 10	4 20	4 30	4 41	4 52	5 2	5 14	5 25	5 36	5 48	6 0	.4
.5	5 0	5 12	5 25	5 38	5 51	6 4	6 18	6 32	6 46	7 0	7 15	7 30	.5
.6	6 0	6 15	6 30	6 46	7 1	7 17	7 34	7 50	8 7	8 25	8 42	9 0	.6
.7	7 0	7 17	7 35	7 53	8 12	8 30	8 49	9 9	9 29	9 49	10 9	10 30	.7
.8	8 0	8 20	8 40	9 1	9 22	9 43	10 5	10 27	10 50	11 13	11 36	12 0	.8
.9	9 0	9 22	9 45	10 8	10 32	10 56	11 21	11 46	12 11	12 37	13 3	13 30	.9
1.	10 0	10 25	10 50	11 16	11 42	12 9	12 36	13 4	13 32	14 1	14 30	15 0	1.
2.	20 0	20 50	21 40	22 32	23 24	24 18	25 12	26 8	27 4	28 2	29 1	30 0	2.
3.	30 0	31 15	32 30	33 48	35 7	36 27	37 49	39 12	40 37	42 3	43 31	45 0	3.
4.	40 1	41 40	43 21	45 4	48 49	48 36	50 25	52 16	54 9	56 4	58 1	60 0	4.
5.	50 1	52 5	54 11	56 20	58 31	60 45	63 1	65 20	67 41	70 5	72 31	75 0	5.
6.	60 1	62 30	65 1	67 36	70 13	72 54	75 37	78 24					6.

C.	HOUR ANGLE												C.
	m. s. 30 30	m. s. 31 0	m. s. 31 30	m. s. 32 0	m. s. 32 30	m. s. 33 0	m. s. 33 30	m. s. 34 0	m. s. 34 30	m. s. 35 0	m. s. 35 30	m. s. 36 0	
.01	0 9	0 10	0 10	0 10	0 11	0 11	0 11	0 12	0 12	0 12	0 13	0 13	.01
.02	0 19	0 19	0 20	0 20	0 21	0 22	0 22	0 23	0 24	0 24	0 25	0 26	.02
.03	0 28	0 29	0 30	0 31	0 32	0 33	0 34	0 35	0 36	0 37	0 38	0 39	.03
.04	0 37	0 38	0 40	0 41	0 42	0 44	0 45	0 46	0 48	0 49	0 50	0 52	.04
.05	0 47	0 48	0 50	0 51	0 53	0 54	0 56	0 58	1 0	1 1	1 3	1 5	.05
.06	0 56	0 58	1 0	1 1	1 3	1 5	1 7	1 9	1 11	1 13	1 16	1 18	.06
.07	1 5	1 7	1 9	1 12	1 14	1 16	1 19	1 21	1 23	1 26	1 28	1 31	.07
.08	1 14	1 17	1 19	1 22	1 24	1 27	1 30	1 32	1 35	1 38	1 41	1 44	.08
.09	1 24	1 26	1 29	1 32	1 35	1 38	1 41	1 44	1 47	1 50	1 53	1 57	.09
.1	1 33	1 36	1 39	1 42	1 46	1 49	1 52	1 56	1 59	2 2	2 6	2 10	.1
.2	3 6	3 12	3 18	3 25	3 31	3 38	3 44	3 51	3 58	4 5	4 12	4 19	.2
.3	4 39	4 48	4 58	5 7	5 17	5 27	5 37	5 47	5 57	6 7	6 18	6 29	.3
.4	6 12	6 24	6 37	6 50	7 2	7 16	7 29	7 42	7 56	8 10	8 24	8 38	.4
.5	7 45	8 0	8 16	8 32	8 48	9 4	9 21	9 38	9 55	10 12	10 30	10 48	.5
.6	9 18	9 37	9 55	10 14	10 34	10 53	11 13	11 34	11 54	12 15	12 36	12 58	.6
.7	10 51	11 13	11 35	11 57	12 14	12 42	13 6	13 29	13 53	14 17	14 42	15 7	.7
.8	12 24	12 49	13 14	13 39	14 5	14 31	14 58	15 25	15 52	16 20	16 48	17 17	.8
.9	13 57	14 25	14 53	15 22	15 51	16 20	16 50	17 20	17 51	18 22	18 54	19 26	.9
1.	15 30	16 1	16 32	17 4	17 36	18 9	18 42	19 16	19 50	20 25	21 0	21 36	1.
2.	31 0	32 2	33 4	34 8	35 12	36 18	37 24	38 32	39 40	40 50	42 0	43 12	2.
3.	46 30	48 3	49 37	51 12	52 49	54 27	56 7	57 48	59 31	61 15	63 1	64 48	3.
4.	62 1	64 4	66 9	68 16	70 25	72 36	74 49	77 4	79 21	81 40	84 1		4.

APPROXIMATE APPARENT TIME OF THE MERIDIAN PASSAGE OF THE PRINCIPAL FIXED STARS. Daily change—4 minutes, nearly.

STAR'S			JANUARY.							
Right Ascension.	Declination.	Name and Magnitude.	1	4	8	12	16	20	24	28
<i>h. m.</i>	<i>° ' "</i>		<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>
0 3	28 33 N.	α Andromedæ (<i>Alpheratz</i>) 2-1	5 20	5 7	4 49	4 32	4 15	3 58	3 41	3 24
0 8	14 38½ N.	γ Pegasi (<i>Algenib</i>) ... 3-0	5 25	5 12	4 54	4 37	4 20	4 3	3 46	3 29
0 35	56 0 N.	α Cassiopeiæ (<i>Schedir</i>) 2-5	5 52	5 39	5 21	5 4	4 46	4 29	4 12	3 56
0 39	18 31 S.	β Ceti (<i>Diphda</i>) 2-1	5 56	5 42	5 25	5 7	4 50	4 33	4 16	3 59
1 4	35 6½ N.	β Andromedæ (<i>Mirach</i>) 2-2	6 21	6 8	5 50	5 33	5 16	4 59	4 42	4 25
1 34	57 44 S.	α Eridani (<i>Achernar</i>) ... 1-0	6 51	6 38	6 20	6 3	5 45	5 28	5 11	4 55
2 2	23 0 N.	α Arietis (<i>Hamul</i>) 2-0	7 19	7 5	6 48	6 30	6 13	5 56	5 39	5 22
2 57	3 42½ N.	α Ceti (<i>Menkar</i>) 2-7	8 14	8 1	7 43	7 26	7 9	6 51	6 35	6 18
3 17	49 31 N.	α Persei 1-9	8 34	8 21	8 3	7 46	7 29	7 12	6 55	6 38
4 30	16 19 N.	α Tauri (<i>Aldebaran</i>) ... 1-0	9 47	9 34	9 16	8 59	8 42	8 25	8 8	7 51
5 9	45 54 N.	α Aurigæ (<i>Capella</i>) 0-2	10 26	10 13	9 56	9 38	9 21	9 4	8 47	8 30
5 10	8 19 S.	β Orionis (<i>Rigel</i>) 0-3	10 27	10 14	9 56	9 38	9 21	9 4	8 47	8 31
5 20	28 31½ N.	β Tauri (<i>El Nath</i>) 1-9	10 37	10 24	10 6	9 49	9 32	9 14	8 58	8 41
5 27	0 22 S.	δ Orionis (<i>Mintaka</i>) ... 2-5	10 44	10 31	10 13	9 56	9 38	9 21	8 58	8 48
5 31	1 16 S.	ε Orionis (<i>Atnilam</i>) ... 1-8	10 48	10 35	10 17	10 0	9 43	9 26	9 9	8 52
5 36	34 8 S.	α Columbæ 2-7	10 53	10 40	10 22	10 5	9 48	9 30	9 14	8 57
5 43	9 42 N.	κ Orionis (<i>Satph</i>) 2-2	11 0	10 47	10 29	10 12	9 55	9 37	9 21	9 4
5 50	7 23 N.	α Orionis (<i>Betelgeuse</i>) ... 1-2	11 7	10 54	10 36	10 19	10 1	9 44	9 27	9 11
6 22	52 39 S.	α Argûs (<i>Canopus</i>) 0-4	11 39	11 25	11 8	10 50	10 33	10 16	9 59	9 43
6 41	16 35 S.	α Canis Maj. (<i>Sirius</i>) - 1-4	11 58	11 45	11 27	11 10	10 52	10 35	10 18	10 2
6 55	28 50½ S.	ε Canis Majoris (<i>Adara</i>) 1-5	12 12	11 58	11 41	11 23	11 6	10 49	10 32	10 16
7 28	32 6 N.	α² Geminorum (<i>Castor</i>) 2-0	12 45	12 32	12 14	11 57	11 40	11 23	11 6	10 49
7 34	5 28½ N.	κ Canis Min. (<i>Procyon</i>) 0-5	12 51	12 38	12 20	12 3	11 46	11 29	11 12	10 55
7 39	28 15½ N.	β Geminorum (<i>Pollux</i>) 1-2	12 56	12 43	12 25	12 8	11 51	11 34	11 17	11 0
9 14	58 52 S.	ι Argûs 2-2	14 31	14 18	14 1	13 43	13 26	13 9	12 52	12 35
9 23	8 14 S.	α Hydriæ (<i>Alphard</i>) ... 2-2	14 40	14 26	14 9	13 51	13 34	13 17	13 0	12 44
10 3	12 26½ N.	α Leonis (<i>Regulus</i>) 1-4	15 20	15 7	14 49	14 32	14 15	13 58	13 41	13 24
10 15	20 20 N.	γ¹ Leonis (<i>Algeib</i>) ... 2-5	15 31	15 18	15 1	14 43	14 26	14 9	13 52	13 35
10 58	62 16½ N.	α Ursæ Majoris (<i>Dubhe</i>) 2-0	16 15	16 2	15 44	15 26	15 9	14 52	14 35	14 18
11 9	21 4 N.	δ Leonis (<i>Zosma</i>) 2-8	16 26	16 13	15 55	15 38	15 20	15 3	14 46	14 30
11 44	15 7 N.	β Leonis (<i>Denebola</i>) ... 2-2	17 1	16 48	16 30	16 13	15 56	15 38	15 22	15 5
11 49	54 14 N.	γ Ursæ Majoris (<i>Phecda</i>) 2-6	17 6	16 52	16 35	16 17	16 0	15 43	15 26	15 9
12 21	62 33½ S.	α¹ Crucis 1-0	17 38	17 25	17 7	16 50	16 33	16 16	15 59	15 42
12 25	15 58 S.	δ² Corvi (<i>Algores</i>) 3-1	17 42	17 28	17 11	16 53	16 36	16 19	16 2	15 46
12 29	22 51½ S.	β Corvi 2-8	17 46	17 33	17 15	16 58	16 41	16 24	16 7	15 50
12 57	11 29 N.	ε Virginis (<i>Vindemiatrix</i>) 3-0	18 14	18 1	17 43	17 26	17 9	16 52	16 35	16 18
13 20	10 39 S.	α Virginis (<i>Spica</i>) 1-2	18 37	18 24	18 6	17 49	17 31	17 14	16 57	16 41
13 44	49 48 N.	η Ursæ Maj. (<i>Benetnasch</i>) 2-0	19 1	18 47	18 30	18 12	17 55	17 38	17 21	17 4
13 57	59 54 S.	β Centauri 0-8	19 14	19 1	18 43	18 26	18 8	17 51	17 34	17 18
14 11	19 41 N.	α Boötis (<i>Arcturus</i>) 0-3	19 28	19 15	18 57	18 40	18 23	18 6	17 49	17 32
14 33	60 26 S.	α² Centauri 1-0	19 50	19 37	19 19	19 2	18 44	18 27	18 10	17 54
14 45	15 38 S.	α Libræ 3-0	20 2	19 49	19 32	19 14	18 57	18 40	18 23	18 6
15 12	9 1½ S.	β Libræ 2-7	20 29	20 15	19 58	19 40	19 23	19 6	18 49	18 33
15 31	27 2½ N.	α Coronæ 2-4	20 47	20 34	20 17	19 59	19 42	19 25	19 8	18 51
15 39	6 44 N.	α Serpentis (<i>Unukalhai</i>) 2-7	20 56	20 43	20 26	20 8	19 51	19 34	19 17	19 0
16 0	19 32 S.	β¹ Scorpii (<i>Akrab</i>) 3-0	21 17	21 3	20 46	20 28	20 11	19 54	19 37	19 21
16 23	26 13 S.	α Scorpii (<i>Antares</i>) 1-2	21 40	21 27	21 10	20 52	20 35	20 18	20 1	19 44
16 38	31 47 N.	ζ Herculis 3-1	21 55	21 42	21 24	21 7	20 50	20 33	20 16	19 59
16 38	68 51 S.	α Trianguli Australis ... 2-2	21 55	21 42	21 24	21 7	20 50	20 33	20 16	19 59
17 5	15 36 S.	η Ophiuchi 2-6	22 22	22 8	21 51	21 33	21 16	20 59	20 42	20 26
17 30	12 38 N.	α Ophiuchi (<i>Ras Alaghu</i>) 2-2	22 47	22 34	22 17	21 59	21 42	21 25	21 8	20 51
17 54	51 30 N.	γ Draconis (<i>Etanin</i>) ... 2-4	23 11	22 58	22 40	22 23	22 6	21 49	21 32	21 15
18 34	38 41½ N.	α Lyræ (<i>Vega</i>) 0-2	23 51	23 37	23 20	23 2	22 45	22 28	22 11	21 54
19 46	8 37 N.	α Aquilæ (<i>Altair</i>) 1-0	1 3	0 50	0 32	0 15	23 57	23 40	23 23	23 7
20 18	57 3 S.	α Pavonis 2-1	1 35	1 21	1 4	0 47	0 29	0 12	23 55	23 39
20 38	44 56 N.	α Cygni (<i>Deneb</i>) 1-3	1 55	1 42	1 24	1 7	0 50	0 32	0 16	23 59
21 16	62 10½ N.	α Cephei (<i>Alderamin</i>) 2-6	2 33	2 20	2 2	1 45	1 28	1 11	0 54	0 37
22 2	47 26 S.	α Gruis 1-9	3 19	3 6	2 48	2 31	2 13	1 56	1 40	1 23
22 52	30 8 S.	α Pis. Aust. (<i>Fomalhaut</i>) 1-3	4 9	3 56	3 38	3 21	3 4	2 47	2 30	2 13
23 0	14 41 N.	α Pegasi (<i>Markab</i>) 2-6	4 17	4 4	3 46	3 29	3 11	2 54	2 37	2 21

APPROXIMATE APPARENT TIME OF THE MERIDIAN PASSAGE OF THE PRINCIPAL FIXED STARS. Daily change—4 minutes, nearly.

STAR'S			FEBRUARY.							
Right Ascension.	Declination.	Name and Magnitude.	1	4	8	12	16	20	24	28
<i>h. m.</i>	<i>° /</i>		<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>
0 3	28 33 N.	α Andromedæ (<i>Alpheratz</i>) 2-1	3 8	2 55	2 39	2 23	2 8	1 52	1 37	1 22
0 8	14 38½ N.	γ Pegasi (<i>Algenib</i>) ... 3-0	3 12	3 0	2 44	2 28	2 12	1 57	1 42	1 27
0 35	56 0 N.	α Cassiopeiæ (<i>Schedir</i>) 2-5	3 39	3 27	3 11	2 55	2 40	2 24	2 9	1 54
0 39	18 31 S.	β Ceti (<i>Diphda</i>) 2-1	3 43	3 31	3 15	2 59	2 44	2 28	2 13	1 58
1 4	35 6½ N.	β Andromedæ (<i>Mirach</i>) 2-2	4 9	3 56	3 40	3 24	3 8	2 53	2 38	2 23
1 34	57 44 S.	α Eridani (<i>Achernar</i>) ... 1-0	4 38	4 26	4 10	3 54	3 38	3 23	3 8	2 53
2 2	23 0 N.	α Arietis (<i>Hamal</i>) 2-0	5 6	4 54	4 38	4 22	4 6	3 51	3 36	3 21
2 57	3 42½ N.	α Ceti (<i>Menkar</i>) 2-7	6 1	5 49	5 33	5 17	5 1	4 46	4 31	4 16
3 17	49 31 N.	α Persei 1-9	6 22	6 9	5 53	5 37	5 21	5 6	4 51	4 36
4 30	16 19 N.	α Tauri (<i>Aldebaran</i>) ... 1-0	7 35	7 22	7 6	6 50	6 34	6 19	6 4	5 49
5 9	45 54 N.	α Aurigæ (<i>Capella</i>) 0-2	8 14	8 2	7 46	7 30	7 14	6 59	6 44	6 29
5 10	8 19 S.	β Orionis (<i>Rigel</i>) 0-3	8 14	8 2	7 46	7 30	7 14	6 59	6 44	6 29
5 20	28 31½ N.	β Tauri (<i>El Nath</i>) ... 1-9	8 24	8 12	7 56	7 40	7 24	7 9	6 54	6 39
5 27	0 22 S.	δ Orionis (<i>Mintaka</i>) ... 2-5	8 31	8 19	8 3	7 47	7 31	7 16	7 1	6 46
5 31	1 16 S.	ϵ Orionis (<i>Anilam</i>) ... 1-8	8 36	8 23	8 7	7 51	7 35	7 20	7 5	6 50
5 36	34 8 S.	α Columbæ 2-7	8 40	8 28	8 12	7 56	7 40	7 25	7 10	6 55
5 43	9 42 S.	κ Orionis (<i>Saiph</i>) 2-2	8 47	8 35	8 19	8 3	7 47	7 32	7 17	7 2
5 50	7 23 N.	α Orionis (<i>Betelgeuse</i>) ... 1-2	8 54	8 42	8 26	8 10	7 54	7 39	7 24	7 9
6 22	52 39 S.	α Argûs (<i>Canopus</i>) 0-4	9 26	9 14	8 58	8 42	8 26	8 11	7 56	7 41
6 41	16 35 S.	α Canis Maj. (<i>Sirius</i>) ... 1-4	9 45	9 33	9 17	9 1	8 45	8 30	8 15	8 0
6 55	28 50½ S.	ϵ Canis Majoris (<i>Adara</i>) 1-5	9 59	9 47	9 31	9 15	8 59	8 44	8 28	8 14
7 28	32 6 N.	α^2 Geminorum (<i>Castor</i>) 2-0	10 33	10 20	10 4	9 49	9 33	9 17	9 2	8 47
7 34	5 28½ N.	α Canis Min. (<i>Procyon</i>) 0-5	10 38	10 26	10 10	9 54	9 38	9 23	9 8	8 53
7 39	23 15½ N.	β Geminorum (<i>Pollux</i>) 1-2	10 44	10 31	10 15	10 0	9 44	9 28	9 13	8 58
9 14	58 52 S.	ϵ Argûs 2-2	12 19	12 7	11 51	11 35	11 19	11 3	10 48	10 33
9 23	8 14 S.	α Hydræ (<i>Alphard</i>) 2-2	12 27	12 15	11 59	11 43	11 27	11 12	10 57	10 42
10 3	12 26½ N.	α Leonis (<i>Regulus</i>) 1-4	13 7	12 55	12 39	12 23	12 7	11 52	11 37	11 22
10 15	20 20 N.	γ^1 Leonis (<i>Algeiba</i>) 2-5	13 19	13 7	12 51	12 35	12 19	12 4	11 49	11 34
10 58	62 16½ N.	α Ursæ Majoris (<i>Dubhe</i>) 2-0	14 2	13 50	13 34	13 18	13 2	12 47	12 32	12 17
11 9	21 4 N.	δ Leonis (<i>Zosma</i>) 2-8	14 13	14 1	13 45	13 29	13 13	12 58	12 43	12 28
11 44	15 7 N.	β Leonis (<i>Denebola</i>) 2-2	14 48	14 36	14 20	14 4	13 48	13 33	13 18	13 3
11 49	54 14 N.	γ Ursæ Majoris (<i>Phæda</i>) 2-6	14 53	14 41	14 25	14 9	13 53	13 38	13 23	13 8
12 21	62 33½ S.	α^1 Crucis 1-0	15 25	15 13	14 57	14 41	14 25	14 10	13 55	13 40
12 25	15 58 S.	δ^2 Corvi (<i>Algores</i>) 3-1	15 29	15 17	15 1	14 45	14 29	14 14	13 59	13 44
12 29	22 51½ S.	β Corvi 2-8	15 34	15 21	15 5	14 49	14 33	14 18	14 3	13 48
12 57	11 29 N.	γ Virginis (<i>Vindemiatrix</i>) 3-0	16 2	15 49	15 33	15 17	15 1	14 46	14 31	14 16
13 20	10 39 S.	α Virginis (<i>Spica</i>) 1-2	16 24	16 12	15 56	15 40	15 24	15 9	14 54	14 39
13 44	49 48 N.	η Ursæ Maj. (<i>Benetnasch</i>) 2-0	16 48	16 36	16 20	16 4	15 48	15 33	15 18	15 3
13 57	59 54 S.	β Centauri 0-8	17 1	16 49	16 33	16 17	16 1	15 46	15 31	15 16
14 11	19 41 N.	α Boëtis (<i>Arcturus</i>) 0-3	17 16	17 3	16 47	16 31	16 15	16 0	15 45	15 30
14 33	60 26 S.	α^2 Centauri 1-0	17 37	17 25	17 9	16 53	16 37	16 21	16 6	15 51
14 45	15 38 S.	α Libræ 3-0	17 50	17 38	17 22	17 6	16 50	16 34	16 19	16 4
15 12	9 1½ S.	β Libræ 2-7	18 16	18 4	17 48	17 32	17 16	17 1	16 46	16 31
15 31	27 2½ N.	α Coronæ 2-4	18 35	18 23	17 7	17 51	17 35	17 19	17 4	16 49
15 39	6 44 N.	α Serpentis (<i>Unukalhai</i>) 2-7	18 44	18 32	18 16	18 0	17 44	17 28	17 13	16 58
16 0	19 32 S.	β^1 Scorpii (<i>Akrab</i>) 3-0	19 4	18 52	18 36	18 20	18 4	17 48	17 33	17 18
16 23	26 13 S.	α Scorpii (<i>Antares</i>) 1-2	19 28	19 16	19 0	18 44	18 28	18 12	17 57	17 42
16 38	31 47 N.	ζ Herculis 1-1	19 43	19 30	19 14	18 58	18 42	18 27	18 12	17 57
16 38	68 51 S.	α Trianguli Australis ... 2-2	19 43	19 30	19 14	18 58	18 42	18 27	18 12	17 57
17 5	15 36 S.	η Ophiuchi 2-6	20 9	19 57	19 41	19 25	19 9	18 54	18 39	18 24
17 30	12 38 N.	α Ophiuchi (<i>Ras Alaghu</i>) 2-2	20 35	20 22	20 6	19 51	19 35	19 19	19 4	18 49
17 54	51 30 N.	γ Draconis (<i>Eltanin</i>) ... 2-4	20 59	20 46	20 30	20 14	19 58	19 43	19 28	19 13
18 34	38 41½ N.	α Lyræ (<i>Vega</i>) 0-2	21 38	21 26	21 10	20 54	20 38	20 23	20 8	19 53
19 46	8 37 N.	α Aquilæ (<i>Altair</i>) 1-0	22 50	22 38	22 22	22 6	21 50	21 35	21 20	21 5
20 18	57 3 S.	α Pavonis 2-1	23 22	23 10	22 54	22 38	22 22	22 7	21 52	21 37
20 38	44 56 N.	α Cygni (<i>Deneb</i>) ... 1-3	23 42	23 30	23 14	22 58	22 42	22 27	22 12	21 57
21 16	62 10½ N.	α Cephei (<i>Alderamin</i>) 2-6	0 21	0 8	23 52	23 36	23 20	23 5	22 50	22 35
22 2	47 26 S.	α Gruis 1-9	1 6	0 54	0 38	0 22	0 6	23 51	23 36	23 21
22 52	30 8 S.	α Pis. Aust. (<i>Fomalhaut</i>) 1-3	1 57	1 44	1 28	1 12	0 56	0 41	0 26	0 11
23 0	14 41 N.	α Pegasi (<i>Markab</i>) 2-6	2 4	1 52	1 36	1 20	1 4	0 49	0 34	0 19

APPROXIMATE APPARENT TIME OF THE MERIDIAN PASSAGE OF THE PRINCIPAL FIXED STARS. Daily change—4 minutes, nearly.

STAR'S			APRIL								
Right Ascension.	Declination.	Name and Magnitude.	1	4	8	12	16	20	24	28	
<i>h. m.</i>	<i>° ' "</i>		<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	
0 3	28 33 N.	α Andromedæ (<i>Alpheratz</i>) 2-1	23 24	23 14	22 59	22 44	22 30	22 15	22 0	21 45	
0 8	14 38½ N.	γ Pegasi (<i>Algenib</i>) ... 3-0	23 29	23 18	23 3	22 49	22 35	22 20	22 5	21 50	
0 35	56 0 N.	α Cassiopeiæ (<i>Schedar</i>) 2-5	23 56	23 45	23 30	23 16	23 1	22 46	22 31	22 16	
0 39	18 31 S.	β Ceti (<i>Diphda</i>) 2-1	0 0	23 49	23 34	23 20	23 5	22 50	22 35	22 20	
1 4	35 6½ N.	β Andromedæ (<i>Mirach</i>) 2-2	0 25	0 14	23 59	23 45	23 31	23 16	23 1	22 46	
1 34	57 44 S.	α Eridani (<i>Achernar</i>) ... 1-0	0 55	0 44	0 29	0 15	0 0	23 45	23 30	23 15	
2 2	23 0 N.	α Arietis (<i>Hamal</i>) 2-0	1 23	1 12	0 57	0 43	0 28	0 13	23 58	23 43	
2 57	3 42½ N.	α Ceti (<i>Menkar</i>) 2-7	2 18	2 7	1 52	1 38	1 24	1 9	0 54	0 39	
3 17	49 31 N.	α Persei 1-9	2 38	2 28	2 13	1 58	1 44	1 29	1 14	0 59	
4 30	16 19 N.	α Tauri (<i>Aldebaran</i>) ... 1-0	3 51	3 41	3 26	3 11	2 57	2 42	2 27	2 12	
5 9	45 54 N.	α Aurigæ (<i>Capella</i>) 0-2	4 31	4 20	4 5	3 50	3 36	3 21	3 6	2 51	
5 10	8 19 S.	β Orionis (<i>Rigel</i>) 0-3	4 41	4 20	4 5	3 50	3 36	3 21	3 6	2 51	
5 20	28 31½ N.	β Tauri (<i>El Nath</i>) 1-9	4 41	4 30	4 15	4 1	3 46	3 32	3 17	3 2	
5 27	0 22 S.	δ Orionis (<i>Menitaka</i>) ... 2-5	4 48	4 37	4 22	4 8	3 53	3 38	3 23	3 8	
5 31	1 16 S.	ϵ Orionis (<i>Alnilam</i>) ... 1-8	4 52	4 41	4 26	4 12	3 58	3 43	3 28	3 13	
5 36	34 8 S.	α Columbæ 2-7	4 57	4 46	4 31	4 17	4 3	3 48	3 33	3 18	
5 43	9 42 S.	ϵ Orionis (<i>Saiph</i>) 2-2	5 4	4 53	4 38	4 24	4 10	3 55	3 40	3 25	
5 50	7 23 N.	α Orionis (<i>Betelgeuse</i>) .. 1-2	5 11	5 0	4 45	4 31	4 16	4 1	3 46	3 31	
6 22	52 39 S.	α Argûs (<i>Canopus</i>) 0-4	5 43	5 32	5 17	5 3	4 48	4 33	4 18	4 3	
6 41	16 35 S.	α Canis Maj. (<i>Sirius</i>) ... 1-4	6 2	5 51	5 36	5 22	5 7	4 52	4 37	4 22	
6 55	28 50½ S.	ϵ Canis Majoris (<i>Adara</i>) 1-5	6 16	6 5	5 50	5 36	5 21	5 6	4 51	4 36	
7 28	32 6 N.	α^2 Geminorum (<i>Castor</i>) 2-0	6 49	6 39	6 24	6 9	5 55	5 40	5 25	5 10	
7 34	5 28½ N.	α Canis Min. (<i>Procyon</i>) 0-5	6 55	6 44	6 29	6 15	6 0	5 46	5 31	5 16	
7 39	28 15½ N.	β Geminorum (<i>Pollux</i>) 1-2	7 0	6 50	6 35	6 20	6 6	5 51	5 36	5 21	
9 14	58 52 S.	ϵ Argûs 2-2	8 36	8 25	8 10	7 55	7 41	7 26	7 11	6 56	
9 23	8 14 S.	α Hydræ (<i>Alphard</i>) ... 2-2	8 44	8 33	8 18	8 4	7 49	7 34	7 19	7 4	
10 3	12 26½ N.	α Leonis (<i>Regulus</i>) 1-4	9 24	9 13	8 58	8 44	8 29	8 15	8 0	7 45	
10 15	20 20 N.	γ^1 Leonis (<i>Algeiba</i>) ... 2-5	9 36	9 25	9 10	8 56	8 41	8 26	8 11	7 56	
10 58	62 16½ N.	α Ursæ Majoris (<i>Dubhe</i>) 2-0	10 19	10 8	9 53	9 39	9 24	9 9	8 54	8 39	
11 9	21 4 N.	δ Leonis (<i>Zosma</i>) 2-8	10 30	10 19	10 4	9 50	9 35	9 20	9 5	8 50	
11 44	15 7 N.	β Leonis (<i>Denebola</i>) ... 2-2	11 5	10 54	10 39	10 25	10 10	9 55	9 40	9 25	
11 49	54 14 N.	γ Ursæ Majoris (<i>Phecda</i>) 2-6	11 10	10 59	10 44	10 30	10 15	10 0	9 45	9 30	
12 21	62 33½ S.	α^1 Crucis 1-0	11 42	11 31	11 16	11 2	10 48	10 33	10 18	10 3	
12 25	15 58 S.	δ^2 Corvi (<i>Algores</i>) 3-1	11 46	11 35	11 20	11 6	10 51	10 36	10 21	10 6	
12 29	22 51½ S.	β Corvi 2-8	11 50	11 39	11 24	11 10	10 56	10 41	10 26	10 11	
12 57	11 29 N.	ϵ Virginis (<i>Vindemiatrix</i>) 3-0	12 18	12 8	11 52	11 38	11 24	11 9	10 54	10 39	
13 20	10 39 S.	α Virginis (<i>Spica</i>) 1-2	12 41	12 30	12 15	12 1	11 46	11 31	11 16	11 1	
13 44	49 48 N.	η Ursæ Maj. (<i>Benetnash</i>) 2-0	13 4	12 53	12 39	12 25	12 10	11 55	11 40	11 25	
13 57	59 54 S.	β Centauri 0-8	13 18	13 7	12 52	12 38	12 23	12 8	11 53	11 38	
14 11	19 41 N.	α Boötis (<i>Arcturus</i>) 0-3	13 32	13 21	13 6	12 52	12 38	12 23	12 8	11 53	
14 33	60 26 S.	α^2 Centauri 1-0	13 54	13 43	13 28	13 14	12 59	12 44	12 29	12 14	
14 45	15 38 S.	α Libræ 3-0	14 7	13 56	13 41	13 26	13 12	12 57	12 42	12 27	
15 12	9 1½ S.	β Libræ 2-7	14 33	14 22	14 7	13 53	13 38	13 23	13 8	12 53	
15 31	27 2½ N.	α Coronæ 2-4	14 52	14 41	14 26	14 12	13 57	13 42	13 27	13 12	
15 39	6 44 N.	α Serpentis (<i>Unukalhai</i>) 2-7	15 1	14 50	14 35	14 20	14 6	13 51	13 36	13 21	
16 0	19 32 S.	β^1 Scorpii (<i>Akrab</i>) 3-0	15 21	15 10	14 55	14 41	14 26	14 11	13 56	13 41	
16 23	20 13 S.	α Scorpii (<i>Antares</i>) 1-2	15 45	15 34	15 19	15 4	14 50	14 35	14 20	14 5	
16 38	31 47 N.	ζ Herculis 3-1	15 59	15 49	15 34	15 19	15 5	14 50	14 35	14 20	
16 38	68 51 S.	α Trianguli Australis ... 2-2	15 59	15 49	15 34	15 19	15 5	14 50	14 35	14 20	
17 5	15 36 S.	η Ophiuchi 2-6	16 26	16 15	16 0	15 46	15 31	15 16	15 1	14 46	
17 30	12 38 N.	α Ophiuchi (<i>Ras Alaghu</i>) 2-2	16 52	16 41	16 26	16 11	15 57	15 42	15 27	15 12	
17 54	51 30 N.	γ Draconis (<i>Etanin</i>) ... 2-4	17 15	17 5	16 50	16 35	16 21	16 6	15 51	15 36	
18 34	38 41½ N.	α Lyræ (<i>Vega</i>) 0-2	17 55	17 44	17 29	17 15	17 0	16 45	16 30	16 15	
19 46	8 37 N.	α Aquilæ (<i>Altair</i>) 1-0	19 7	18 56	18 41	18 27	18 12	17 57	17 42	17 27	
20 18	57 3 S.	α Pavonis 2-1	19 39	19 28	19 13	18 59	18 44	18 29	18 14	17 59	
20 38	44 56 N.	α Cygni (<i>Deneb</i>) 1-3	19 59	19 48	19 33	19 19	19 4	18 49	18 34	18 19	
21 16	62 10½ N.	α Cephei (<i>Alderamin</i>) 2-6	20 37	20 26	20 11	19 57	19 43	19 28	19 13	18 58	
22 2	47 26 S.	α Gruis 1-9	21 23	21 12	20 57	20 43	20 28	20 13	19 58	19 43	
22 52	30 8 S.	α Pis. Aust. (<i>Fomalhaut</i>) 1-3	22 13	22 2	21 47	21 33	21 19	21 4	20 49	20 34	
23 0	14 41 N.	α Pegasi (<i>Markab</i>) 2-6	22 21	22 10	21 55	21 41	21 26	21 11	20 56	20 41	

APPROXIMATE APPARENT TIME OF THE MERIDIAN PASSAGE OF THE
PRINCIPAL FIXED STARS. *Daily change—4 minutes, nearly.*

STAR'S			MAY.							
Right Ascension.	Declination.	Name and Magnitude.	1	4	8	12	16	20	24	28
<i>h. m.</i>	<i>° /</i>		<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>
0 3	28 33 N.	α Andromedæ (<i>Alpheratz</i>) 2-1	21 33	21 22	21 6	20 50	20 34	20 19	20 3	19 47
0 8	14 38½ N.	γ Pegasi (<i>Algenib</i>) ... 3-0	21 38	21 27	21 11	20 55	20 39	20 24	20 8	19 52
0 35	56 0 N.	α Cassiopeiæ (<i>Schedir</i>) 2-5	22 5	21 53	21 38	21 22	21 6	20 51	20 35	20 19
0 39	18 31 S.	β Ceti (<i>Diphda</i>) 2-1	22 9	21 57	21 42	21 26	21 10	20 55	20 39	20 23
1 4	35 6½ N.	β Andromedæ (<i>Mirach</i>) 2-2	22 34	22 23	22 7	21 51	21 35	21 20	21 4	20 48
1 34	57 44 S.	α Eridani (<i>Achernar</i>) ... 1-0	23 4	22 53	22 37	22 21	22 5	21 50	21 34	21 18
2 2	23 0 N.	α Arietis (<i>Hamal</i>) 2-0	23 32	23 20	23 5	22 49	22 33	22 18	22 2	21 46
2 57	3 42½ N.	α Ceti (<i>Menkar</i>) 2-7	0 27	0 16	0 0	23 44	23 28	23 13	22 57	22 41
3 17	49 31 N.	α Persei 1-9	0 47	0 36	0 20	0 4	23 48	23 33	23 17	23 1
4 30	16 19 N.	α Tauri (<i>Aldebaran</i>) ... 1-0	2 0	1 49	1 33	1 17	1 1	0 46	0 30	0 14
5 9	45 54 N.	α Aurigæ (<i>Capella</i>) 0-2	2 39	2 28	2 13	1 57	1 41	1 25	1 9	0 53
5 10	8 19 S.	β Orionis (<i>Rigel</i>) 0-3	2 40	2 28	2 13	1 57	1 41	1 26	1 10	0 54
5 20	28 31½ N.	β Tauri (<i>El Nath</i>) ... 1-9	2 50	2 39	2 23	2 7	1 51	1 36	1 20	1 4
5 27	0 22 S.	δ Orionis (<i>Mintaka</i>) ... 2-5	2 57	2 46	2 30	2 14	1 58	1 43	1 27	1 11
5 31	1 16 S.	ϵ Orionis (<i>Alnilam</i>) ... 1-8	3 1	2 50	2 34	2 18	2 2	1 47	1 31	1 15
5 36	34 8 S.	α Columbæ 2-7	3 6	2 55	2 39	2 23	2 7	1 52	1 36	1 20
5 43	9 42 S.	ϵ Orionis (<i>Saiph</i>) 2-2	3 13	3 2	2 46	2 30	2 14	1 59	1 43	1 27
5 50	7 23 N.	α Orionis (<i>Betelgeuse</i>) ... 1-2	3 20	3 8	2 53	2 37	2 21	2 6	1 50	1 34
6 22	52 39 S.	α Argûs (<i>Canopus</i>) 0-4	3 52	3 40	3 25	3 9	2 53	2 38	2 22	2 6
6 41	16 35 S.	α Canis Maj. (<i>Sirius</i>) - 1-4	4 11	3 59	3 44	3 28	3 12	2 57	2 41	2 25
6 55	28 50½ S.	ϵ Canis Majoris (<i>Adara</i>) 1-5	4 25	4 13	3 58	3 42	3 26	3 11	2 55	2 39
7 28	32 6 N.	α^2 Geminorum (<i>Castor</i>) 2-0	4 58	4 47	4 31	4 15	3 59	3 44	3 28	3 12
7 34	5 28½ N.	α Canis Min. (<i>Procyon</i>) 0-5	4 4	4 53	4 37	4 21	4 5	3 50	3 34	3 18
7 39	28 15½ N.	β Geminorum (<i>Pollux</i>) 1-2	5 9	4 58	4 42	4 26	4 10	3 55	3 39	3 23
9 14	58 52 S.	ϵ Argûs 2-2	6 44	6 33	6 18	6 2	5 46	5 30	5 14	4 58
9 23	8 14 S.	α Hydræ (<i>Alphard</i>) 2-2	6 53	6 41	6 26	6 10	5 54	5 39	5 23	5 7
10 3	12 26½ N.	α Leonis (<i>Regulus</i>) 1-4	7 33	7 22	7 6	6 50	6 34	6 19	6 3	5 47
10 15	20 20 N.	γ^1 Leonis (<i>Algeiba</i>) ... 2-5	7 45	7 33	7 18	7 2	6 46	6 31	6 15	5 59
10 58	62 16½ N.	α Ursæ Majoris (<i>Dubhe</i>) 2-0	8 28	8 16	8 1	7 45	7 29	7 14	6 58	6 42
11 9	21 4 N.	δ Leonis (<i>Zosma</i>) 2-8	8 39	8 27	8 12	7 56	7 40	7 25	7 9	6 53
11 44	15 7 N.	β Leonis (<i>Denebola</i>) ... 2-2	9 14	9 3	8 47	8 31	8 15	8 0	7 44	7 28
11 49	54 14 N.	γ Ursæ Majoris (<i>Phecda</i>) 2-6	9 19	9 7	8 52	8 36	8 20	8 5	7 49	7 33
12 21	62 33½ S.	α^1 Crucis 1-0	9 51	9 40	9 24	9 8	8 52	8 37	8 21	8 5
12 25	15 58 S.	δ^2 Corvi (<i>Algores</i>) 3-1	9 55	9 43	9 28	9 12	8 56	8 41	8 25	8 9
12 29	22 51½ S.	β Corvi (<i>Antares</i>) 2-8	9 59	9 48	9 32	9 16	9 0	8 45	8 29	8 13
12 57	11 29 N.	ϵ Virginis (<i>Vindemiatrix</i>) 3-0	10 27	10 16	10 0	9 44	9 28	9 13	8 57	8 41
13 20	10 39 S.	α Virginis (<i>Spica</i>) 1-2	10 50	10 39	10 23	10 7	9 51	9 36	9 20	9 4
13 44	49 48 N.	η Ursæ Maj. (<i>Benetnasch</i>) 2-0	11 14	11 2	10 47	10 31	10 15	10 0	9 44	9 28
13 57	59 54 S.	β Centauri 0-8	11 27	11 15	11 0	10 44	10 28	10 13	9 57	9 41
14 11	19 41 N.	α Boötis (<i>Arcturus</i>) 0-3	11 41	11 30	11 14	10 58	10 42	10 27	10 11	9 55
14 33	60 26 S.	α^2 Centauri 1-0	12 3	11 51	11 36	11 20	11 4	10 49	10 33	10 17
14 45	15 38 S.	α Libræ 3-0	12 15	12 4	11 49	11 33	11 17	11 1	10 45	10 29
15 12	9 1½ S.	β Libræ 2-7	12 42	12 30	12 15	11 59	11 43	11 28	11 12	10 56
15 31	27 2½ N.	α Coronæ 2-4	13 1	12 49	12 34	12 18	12 2	11 47	11 31	11 15
15 39	6 44 N.	α Serpentis (<i>Unukalhai</i>) 2-7	13 9	12 58	12 43	12 27	12 11	11 55	11 39	11 23
16 0	19 32 N.	β^1 Scorpii (<i>Akrab</i>) 3-0	13 30	13 18	13 3	12 47	12 31	12 16	12 0	11 44
16 23	26 13 S.	α Scorpii (<i>Antares</i>) 1-2	13 53	13 42	13 27	13 11	12 55	12 39	12 23	12 7
16 38	31 47 N.	ζ Herculis 3-1	14 8	13 57	13 41	13 25	13 9	12 54	12 38	12 22
16 38	68 51 S.	α Trianguli Australis 2-2	14 8	13 57	13 41	13 25	13 9	12 54	12 38	12 22
17 5	15 36 S.	η Ophiuchi 2-6	14 35	14 23	14 8	13 52	13 36	13 21	13 5	12 49
17 30	12 38 N.	α Ophiuchi (<i>Rasalaghu</i>) 2-2	15 0	14 49	14 33	14 17	14 1	13 46	13 30	13 14
17 54	51 30 N.	γ Draconis (<i>Etanin</i>) ... 2-4	15 24	15 13	14 57	14 41	14 25	14 10	13 54	13 38
18 34	38 41½ N.	α Lyræ (<i>Vega</i>) 0-2	16 4	15 52	15 37	15 21	15 5	14 50	14 34	14 18
19 46	8 37 N.	α Aquilæ (<i>Altair</i>) 1-0	17 16	17 5	16 49	16 33	16 17	16 2	15 46	15 30
20 18	57 3 S.	α Pavonis 2-1	17 48	17 36	17 21	17 5	16 49	16 34	16 18	16 2
20 38	44 56 N.	α Cygni (<i>Deneb</i>) ... 1-3	18 8	17 57	17 41	17 25	17 9	16 54	16 38	16 22
21 16	62 10½ N.	α Cephei (<i>Alderamin</i>) 2-6	18 46	18 35	18 19	18 3	17 47	17 32	17 16	17 0
22 2	47 26 S.	α Gruis 1-9	19 32	19 21	19 5	18 49	18 33	18 18	18 2	17 46
22 52	30 8 S.	α Pis. Aust. (<i>Fomalhaut</i>) 1-3	20 22	20 11	19 55	19 39	19 23	19 8	18 52	18 36
23 0	14 41 N.	α Pegasi (<i>Markab</i>) 2-6	20 30	20 18	20 3	19 47	19 31	19 16	19 1	18 45

APPROXIMATE APPARENT TIME OF THE MERIDIAN PASSAGE OF THE PRINCIPAL FIXED STARS. *Daily change—4 minutes, nearly.*

STAR'S			JUNE.							
Right Ascension.	Declination.	Name and Magnitude.	1	4	8	12	16	20	24	28
<i>h. m.</i>	<i>° ' "</i>		<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>
0 3	28 33 N.	α Andromedæ (<i>Alpheratz</i>) 2-1	19 31	19 18	19 2	18 45	18 28	18 12	17 55	17 38
0 8	14 38½ N.	γ Pegasi (<i>Algenib</i>) 3-0	19 36	19 23	19 6	18 49	18 32	18 17	18 0	17 43
0 35	56 0 N.	α Cassiopeiæ (<i>Schedir</i>) 2-5	20 2	19 50	19 34	19 17	19 0	18 44	18 27	18 10
0 39	18 31 S.	β Ceti (<i>Diphda</i>) 2-1	20 6	19 54	19 37	19 21	19 4	18 48	18 31	18 14
1 4	35 6½ N.	β Andromedæ (<i>Mirach</i>) 2-2	20 32	20 19	20 3	19 46	19 29	19 13	18 56	18 39
1 34	57 44 S.	α Eridani (<i>Achernar</i>) ... 1-0	21 2	20 49	20 33	20 16	19 59	19 43	19 26	19 9
2 2	23 0 N.	α Arietis (<i>Hamal</i>) 2-0	21 29	21 17	21 0	20 44	20 27	20 11	19 54	19 37
2 57	3 42½ N.	α Ceti (<i>Menkar</i>) 2-2	22 25	22 12	21 56	21 39	21 22	21 6	20 49	20 32
3 17	49 31 N.	α Persei 1-9	22 45	22 32	22 16	21 59	21 42	21 26	21 9	20 52
4 30	16 19 N.	α Tauri (<i>Aldebaran</i>) ... 1-0	23 58	23 45	23 29	23 12	22 55	22 39	22 22	22 5
5 9	45 54 N.	α Aurigæ (<i>Capella</i>) 0-2	0 37	0 24	0 8	23 51	23 34	23 18	23 1	22 44
5 10	8 19 S.	β Orionis (<i>Rigel</i>) 0-3	0 37	0 25	0 9	23 52	23 35	23 19	23 2	22 45
5 20	28 31½ N.	β Tauri (<i>El Nath</i>) 1-9	0 48	0 35	0 19	0 2	23 45	23 29	23 12	22 55
5 27	0 22 S.	δ Orionis (<i>Mintaka</i>) ... 2-5	0 54	0 42	0 26	0 9	23 52	23 36	23 19	23 2
5 31	1 16 S.	ε Orionis (<i>Alnilam</i>) ... 1-8	0 59	0 46	0 30	0 13	23 56	23 40	23 23	23 6
5 36	34 8 S.	α Columbæ 2-7	1 4	0 51	0 35	0 18	0 1	23 45	23 28	23 11
5 43	9 42 S.	κ Orionis (<i>Saiph</i>) 2-0	1 11	0 58	0 42	0 25	0 8	23 52	23 35	23 18
5 50	7 23 N.	α Orionis (<i>Betelgeuse</i>) ... 1-2	1 17	1 5	0 49	0 32	0 15	23 59	23 42	23 25
6 22	52 39 S.	α Argûs (<i>Canopus</i>) 0-4	1 49	1 37	1 20	1 4	0 47	0 31	0 14	23 57
6 41	16 35 S.	α Canis Maj. (<i>Sirius</i>) - 1-4	2 8	1 56	1 40	1 23	1 6	0 50	0 33	0 16
6 55	28 50½ S.	ε Canis Majoris (<i>Adara</i>) 1-5	2 22	2 10	1 53	1 36	1 20	1 4	0 47	0 30
7 28	32 6 N.	α² Geminorum (<i>Castor</i>) 2-0	2 56	2 44	2 27	2 10	1 53	1 37	1 20	1 3
7 34	5 28½ N.	α Canis Min. (<i>Procyon</i>) 0-5	3 2	2 49	2 33	2 16	1 59	1 43	1 26	1 9
7 39	28 15½ N.	β Geminorum (<i>Pollux</i>) 1-2	3 7	2 55	2 38	2 21	2 4	1 48	1 31	1 14
9 14	58 52 S.	ε Argûs 2-2	4 42	4 30	4 13	3 56	3 39	3 23	3 6	2 49
9 23	8 14 S.	α Hydræ (<i>Alphard</i>) ... 2-2	4 50	4 38	4 22	4 5	3 48	3 32	3 15	2 58
10 3	12 26½ N.	α Leonis (<i>Regulus</i>) 1-4	5 31	5 18	5 2	4 45	4 28	4 12	3 55	3 38
10 15	20 20 N.	γ¹ Leonis (<i>Algeiba</i>) ... 2-5	5 42	5 30	5 13	4 57	4 40	4 24	4 7	3 50
10 58	62 16½ N.	α Ursæ Majoris (<i>Dubhe</i>) 2-0	6 25	6 13	5 56	5 40	5 23	5 7	4 50	4 33
11 9	21 4 N.	δ Leonis (<i>Zosma</i>) 2-8	6 36	6 24	6 8	5 51	5 34	5 18	5 1	4 44
11 44	15 7 N.	β Leonis (<i>Denebola</i>) ... 2-2	7 12	6 59	6 43	6 26	6 9	5 53	5 36	5 19
11 49	54 14 N.	γ Ursæ Majoris (<i>Phecda</i>) 2-6	7 16	7 4	6 47	6 31	6 14	5 58	5 41	5 24
12 21	62 33½ S.	α¹ Crucis 1-0	7 49	7 36	7 20	7 3	6 46	6 30	6 13	5 56
12 25	15 51 S.	δ² Corvi (<i>Algores</i>) 3-1	7 52	7 40	7 24	7 7	6 50	6 34	6 17	6 0
12 29	22 51½ S.	β Corvi 2-8	7 57	7 44	7 28	7 11	6 54	6 38	6 21	6 4
12 57	11 29 N.	ε Virginis (<i>Vindemiatrix</i>) 3-0	8 25	8 13	7 56	7 39	7 22	7 6	6 49	6 32
13 20	10 39 S.	α Virginis (<i>Spica</i>) 1-2	8 48	8 35	8 19	8 2	7 45	7 29	7 12	6 55
13 44	49 48 N.	η Ursæ Maj. (<i>Benetnasch</i>) 2-0	9 11	8 59	8 42	8 25	8 9	7 53	7 36	7 19
13 57	59 54 S.	β Centauri 0-8	9 24	9 12	8 56	8 39	8 22	8 6	7 49	7 32
14 11	19 41 N.	α Boötis (<i>Arcturus</i>) 0-3	9 39	9 26	9 10	8 53	8 36	8 20	8 3	7 46
14 33	60 26 S.	α² Centauri 1-0	10 0	9 48	9 32	9 15	8 58	8 42	8 25	8 8
14 45	15 38 S.	α Libræ 3-0	10 13	10 1	9 44	9 27	9 10	8 54	8 37	8 20
15 12	9 1½ S.	β Libræ 2-7	10 39	10 27	10 10	9 54	9 37	9 21	9 4	8 47
15 31	27 2½ N.	α Coronæ 2-4	10 58	10 46	10 29	10 13	9 56	9 40	9 23	9 6
15 39	6 44 N.	α Serpentis (<i>Unukalhai</i>) 2-7	11 7	10 55	10 38	10 21	10 4	9 48	9 31	9 14
16 0	19 32 S.	β¹ Scorpii (<i>Akrab</i>) 3-0	11 27	11 15	10 58	10 42	10 25	10 9	9 52	9 35
16 23	26 13 S.	α Scorpii (<i>Antares</i>) 1-2	11 51	11 38	11 22	11 5	10 48	10 32	10 15	9 58
16 38	31 47 N.	ζ Herculis 3-1	12 6	11 53	11 37	11 20	11 3	10 47	10 30	10 13
16 38	68 51 S.	α Trianguli Australis ... 2-2	12 6	11 53	11 37	11 20	11 3	10 47	10 30	10 13
17 5	15 36 S.	η Ophiuchi 2-6	12 32	12 20	12 3	11 47	11 30	11 14	10 57	10 40
17 30	12 38 N.	α Ophiuchi (<i>Ras Alaghu</i>) 2-2	12 58	12 46	12 29	12 12	11 55	11 39	11 22	11 5
17 54	51 30 N.	γ Draconis (<i>Etanin</i>) ... 2-4	13 22	13 10	12 53	12 36	12 19	12 3	11 46	11 29
18 34	38 41½ N.	α Lyræ (<i>Vega</i>) 0-2	14 1	13 49	13 32	13 16	12 59	12 43	12 26	12 9
19 46	8 37 N.	α Aquilæ (<i>Altair</i>) 1-0	15 13	15 1	14 45	14 28	14 11	13 55	13 38	13 21
20 18	57 3 S.	α Pavonis 2-1	15 45	15 33	15 17	15 0	14 43	14 27	14 10	13 53
20 38	44 56 N.	α Cygni (<i>Deneb</i>) 1-3	16 6	15 53	15 37	15 20	15 3	14 47	14 30	14 13
21 16	62 10½ N.	α Cephei (<i>Alderamin</i>) 2-6	16 44	16 31	16 15	15 58	15 41	15 25	15 8	14 51
22 2	47 26 S.	α Gruis 1-9	17 30	17 17	17 1	16 44	16 27	16 11	15 54	15 37
22 52	30 8 S.	α Pis. Aus. (<i>Fomalhaut</i>) 1-3	18 20	18 7	17 51	17 34	17 17	17 1	16 44	16 27
23- 0	14 41 N.	α Pegasi (<i>Markab</i>) 2-6	18 27	18 15	17 59	17 42	17 25	17 9	16 52	16 35

APPROXIMATE APPARENT TIME OF THE MERIDIAN PASSAGE OF THE PRINCIPAL FIXED STARS. *Daily change—4 minutes, nearly.*

STAR'S			JULY.							
Right Ascension.	Declination.	Name and Magnitude.	1	4	8	12	16	20	24	28
<i>h. m.</i>	<i>° /</i>	<i>N.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>
0 3	28 33	α Andromedæ (<i>Alpheratz</i>) 2-1	17 27	17 14	16 58	16 41	16 25	16 9	15 53	15 37
0 8	14 38½	γ Pegasi (<i>Algenib</i>) ... 3-0	17 31	17 19	17 3	16 46	16 30	16 14	15 58	15 42
0 35	56 0	α Cassiopeiæ (<i>Schedir</i>) 2-5	17 58	17 46	17 29	17 13	16 57	16 41	16 25	16 9
0 39	18 31	β Ceti (<i>Diphda</i>) 2-1	18 2	17 50	17 33	17 16	17 0	16 44	16 28	16 12
1 4	35 6½	β Andromedæ (<i>Mirach</i>) 2-2	18 27	18 15	17 59	17 42	17 26	17 10	16 54	16 38
1 34	57 44	α Eridani (<i>Achernar</i>) ... 1-0	18 57	18 45	18 28	18 12	17 56	17 40	17 24	17 8
2 2	23 0	α Arietis (<i>Hamal</i>) 2-0	19 25	19 13	18 56	18 39	18 23	18 7	17 51	17 35
2 57	3 42½	α Ceti (<i>Menkar</i>) 2-7	20 20	20 8	19 52	19 35	19 19	19 3	18 47	18 31
3 17	49 31	α Persei 1-9	20 41	20 28	20 12	19 55	19 39	19 23	19 7	18 51
4 30	16 19	α Tauri (<i>Aldebaran</i>) ... 1-0	21 54	21 42	21 25	21 8	20 52	20 36	20 20	20 4
5 9	45 54	α Aurigæ (<i>Capella</i>) 0-2	22 33	22 20	22 4	21 47	21 31	21 15	20 59	20 43
5 10	8 19	β Orionis (<i>Rigel</i>) 0-3	22 33	22 21	22 4	21 48	21 32	21 16	21 0	20 44
5 20	28 31½	β Tauri (<i>El Nath</i>) ... 1-9	22 43	22 31	22 15	21 58	21 42	21 26	21 10	20 54
5 27	0 22	δ Orionis (<i>Mintaka</i>) ... 2-5	22 50	22 38	22 21	22 5	21 49	21 33	21 17	21 1
5 31	1 16	ε Orionis (<i>Alnilam</i>) ... 1-8	22 55	22 42	22 26	22 9	21 53	21 37	21 21	21 5
5 36	34 8	α Columbæ 2-7	22 59	22 47	22 31	22 14	21 58	21 42	21 26	21 10
5 43	9 42	κ Orionis (<i>Saiph</i>) ... 2-2	23 6	22 54	22 38	22 21	22 5	21 49	21 33	21 17
5 50	7 23	α Orionis (<i>Betelgeuse</i>) ... 1-2	23 13	23 1	22 44	22 28	22 12	21 56	21 40	21 24
6 22	52 39	α Argûs (<i>Canopus</i>) 0-4	23 45	23 33	23 16	22 59	22 43	22 27	22 11	21 55
6 41	16 35	α Canis Maj. (<i>Sirius</i>) - 1-4	0 4	23 52	23 35	23 19	23 3	22 47	22 31	22 15
6 55	28 50½	ε Canis Majoris (<i>Adara</i>) 1-5	0 18	0 6	23 49	23 32	23 16	23 0	22 44	22 28
7 28	32 6	α² Geminorum (<i>Castor</i>) 2-0	0 52	0 39	0 23	0 6	23 50	23 34	23 18	23 2
7 34	5 28½	α Canis Min. (<i>Procyon</i>) 0-5	0 57	0 45	0 29	0 12	23 56	23 40	23 24	23 8
7 39	28 15½	β Geminorum (<i>Pollux</i>) 1-2	1 3	0 50	0 34	0 17	0 1	23 45	23 29	23 13
9 14	58 52	ε Argûs 2-2	2 38	2 25	2 9	1 52	1 36	1 20	1 4	0 48
9 23	8 14	α Hydriæ (<i>Alphard</i>) ... 2-2	2 46	2 34	2 17	2 0	1 44	1 28	1 12	0 56
10 3	12 26½	α Leonis (<i>Regulus</i>) 1-4	3 26	3 14	2 58	2 41	2 25	2 9	1 53	1 37
10 15	20 20	γ¹ Leonis (<i>Algeiba</i>) ... 2-5	3 38	3 26	3 9	2 52	2 36	2 20	2 4	1 48
10 58	62 16½	α Ursæ Majoris (<i>Dubhe</i>) 2-0	4 21	4 9	3 52	3 35	3 19	3 3	2 47	2 31
11 9	21 4	δ Leonis (<i>Zosma</i>) 2-8	4 32	4 20	4 3	3 47	3 31	3 15	2 59	2 43
11 44	15 7	β Leonis (<i>Denebola</i>) ... 2-2	5 7	4 55	4 38	4 22	4 6	3 50	3 34	3 18
11 49	54 14	γ Ursæ Majoris (<i>Phecda</i>) 2-6	5 12	5 0	4 43	4 26	4 10	3 54	3 38	3 22
12 21	62 33½	α¹ Crucis 1-0	5 44	5 32	5 16	4 59	4 43	4 27	4 11	3 55
12 25	15 58	δ² Corvi (<i>Algores</i>) 3-1	5 48	5 36	5 19	5 2	4 46	4 30	4 14	3 58
12 29	22 51½	β Corvi 2-8	5 53	5 40	5 24	5 7	4 51	4 35	4 19	4 3
12 57	11 29	ε Virginis (<i>Vindemiatrix</i>) 3-0	6 21	6 8	5 52	5 35	5 19	5 3	4 47	4 31
13 20	10 39	α Virginis (<i>Spica</i>) ... 1-2	6 43	6 31	6 14	5 58	5 42	5 26	5 10	4 54
13 44	49 48	η Ursæ Maj. (<i>Benetnasch</i>) 2-0	7 7	6 55	6 38	6 21	6 5	5 49	5 33	5 17
13 57	59 54	β Centauri 0-8	7 20	7 8	6 51	6 35	6 19	6 3	5 47	5 31
14 11	19 41	α Boötis (<i>Arcturus</i>) 0-3	7 34	7 22	7 6	6 49	6 33	6 17	6 1	5 46
14 33	60 26	α² Centauri 1-0	7 56	7 44	7 27	7 11	6 55	6 39	6 23	6 7
14 45	15 38	α Libræ 3-0	8 9	7 56	7 40	7 23	7 7	6 51	6 35	6 19
15 12	9 1½	β Libræ 2-7	8 35	8 23	8 6	7 49	7 33	7 17	7 1	6 45
15 31	27 2½	α Corone 2-4	8 54	8 42	8 25	8 8	7 52	7 36	7 20	7 4
15 39	6 44	α Serpentis (<i>Unukalhai</i>) 2-7	9 3	8 50	8 34	8 17	8 1	7 45	7 29	7 13
16 0	19 32	β¹ Scorpii (<i>Akrab</i>) 3-0	9 23	9 11	8 54	8 37	8 21	8 5	7 49	7 33
16 23	26 13	α Scorpii (<i>Antares</i>) 1-2	9 47	9 34	9 18	9 1	8 45	8 29	8 13	7 57
16 38	31 47	ζ Herculis 3-1	10 2	9 49	9 33	9 16	9 0	8 44	8 28	8 12
16 38	68 51	α Trianguli Australis ... 2-2	10 2	9 49	9 33	9 16	9 0	8 44	8 28	8 12
17 5	15 36	η Ophiuchi 2-6	10 28	10 16	9 59	9 42	9 26	9 10	8 54	8 38
17 30	12 38	α Ophiuchi (<i>Rasalhague</i>) 2-2	10 54	10 41	10 25	10 8	9 52	9 36	9 20	9 4
17 54	51 30	γ Draconis (<i>Etanin</i>) ... 2-4	11 18	11 5	10 49	10 32	10 16	10 0	9 44	9 28
18 34	38 41½	α Lyræ (<i>Vega</i>) 0-2	11 57	11 44	11 28	11 11	10 55	10 39	10 23	10 7
19 46	8 37	α Aquilæ (<i>Altair</i>) 1-0	13 9	12 57	12 40	12 24	12 8	11 52	11 36	11 20
20 18	57 3	α Pavonis 2-1	13 41	13 29	13 12	12 56	12 40	12 24	12 8	11 52
20 38	44 56	α Cygni (<i>Deneb</i>) 1-3	14 1	13 49	13 32	13 16	13 0	12 44	12 28	12 12
21 16	62 10½	α Cephei (<i>Aldramin</i>) 2-6	14 39	14 27	14 11	13 54	13 38	13 22	13 6	12 50
22 2	47 26	α Gruis 1-9	15 25	15 13	14 56	14 40	14 24	14 8	13 52	13 36
22 52	30 8	α Pis. Aust. (<i>Fomalhaut</i>) 1-3	16 15	16 3	15 47	15 30	15 14	14 58	14 42	14 26
23 0	14 41	α Pegasi (<i>Markab</i>) 2-6	16 23	16 11	15 54	15 38	15 22	15 6	14 50	14 34

APPROXIMATE APPARENT TIME OF THE MERIDIAN PASSAGE OF THE PRINCIPAL FIXED STARS. Daily change—4 minutes, nearly.

STAR'S			AUGUST.								
Right Ascension.	Declination.	Name and Magnitude.	1	4	8	12	16	20	24	28	
<i>h. m.</i>	<i>° /</i>		<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	
0 3	28 33 N.	α Andromedæ (<i>Alpheratz</i>) 2-1	15 22	15 10	14 55	14 39	14 24	14 9	13 54	13 39	
0 8	14 38½ N.	γ Pegasi (<i>Algenib</i>) 3-0	15 26	15 15	14 59	14 44	14 29	14 14	13 59	13 44	
0 35	56 0 N.	α Cassiopeie (<i>Schedir</i>) 2-5	15 53	15 42	15 26	15 11	14 56	14 41	14 26	14 11	
0 39	18 31 S.	β Ceti (<i>Diphda</i>) 2-1	15 57	15 45	15 30	15 15	15 0	14 45	14 30	14 15	
1 4	35 6½ N.	β Andromedæ (<i>Mirach</i>) 2-2	16 22	16 11	15 55	15 40	15 25	15 10	14 55	14 40	
1 34	57 44 S.	α Eridani (<i>Achernar</i>) ... 1-0	16 52	16 41	16 25	16 10	15 55	15 40	15 25	15 10	
2 2	23 0 N.	α Arietis (<i>Hamal</i>) 2-0	17 20	17 8	16 53	16 38	16 23	16 8	15 53	15 38	
2 57	3 42½ N.	α Ceti (<i>Menkar</i>) 2-7	18 15	18 4	17 48	17 33	17 18	17 3	16 48	16 33	
3 17	49 31 N.	α Persei 1-9	18 36	18 24	18 9	17 53	17 38	17 23	17 8	16 53	
4 30	16 19 N.	α Tauri (<i>Aldebaran</i>) ... 1-0	19 49	19 37	19 22	19 6	18 51	18 36	18 21	18 6	
5 9	45 54 N.	α Aurigæ (<i>Capella</i>) 0-2	20 28	20 16	20 1	19 46	19 31	19 16	19 1	18 46	
5 10	8 19 S.	β Orionis (<i>Rigel</i>) 0-3	20 28	20 16	20 1	19 46	19 31	19 16	19 1	18 46	
5 20	28 31½ N.	β Tauri (<i>El Nath</i>) 1-9	20 38	20 27	20 11	19 56	19 41	19 26	19 11	18 56	
5 27	0 22 S.	δ Orionis (<i>Mintaka</i>) ... 2-5	20 45	20 34	20 18	20 3	19 48	19 33	19 18	19 3	
5 31	1 16 S.	ε Orionis (<i>Anilam</i>) ... 1-8	20 49	20 38	20 22	20 7	19 52	19 37	19 22	19 7	
5 36	34 8 S.	α Columbæ 2-7	20 54	20 43	20 27	20 12	19 57	19 42	19 27	19 12	
5 43	9 42 S.	κ Orionis (<i>Saiph</i>) 2-2	21 1	20 50	20 34	20 19	20 4	19 49	19 34	19 19	
5 50	7 23 N.	α Orionis (<i>Betelgeuse</i>) ... 1-2	21 8	20 56	20 41	20 26	20 11	19 56	19 41	19 26	
6 22	52 39 S.	α Argūs (<i>Canopus</i>) 0-4	21 40	21 28	21 13	20 58	20 43	20 28	20 13	19 58	
6 41	16 35 S.	α Canis Maj. (<i>Sirius</i>) - 1-4	21 59	21 47	21 32	21 17	21 2	20 47	20 32	20 17	
6 55	28 50½ S.	ε Canis Majoris (<i>Adara</i>) 1-5	22 13	22 1	21 46	21 31	21 16	21 1	20 46	20 31	
7 28	32 6 N.	α² Geminorum (<i>Castor</i>) 2-0	22 47	22 35	22 20	22 4	21 49	21 34	21 19	21 4	
7 34	5 28½ N.	α Canis Min. (<i>Procyon</i>) 0-5	22 52	22 41	22 25	22 10	21 55	21 40	21 25	21 10	
7 39	28 15½ N.	β Geminorum (<i>Pollux</i>) 1-2	22 58	22 46	22 31	22 15	22 0	21 45	21 30	21 15	
9 14	58 52 S.	ε Argūs 2-2	0 33	0 21	0 6	23 51	23 36	23 21	23 6	22 51	
9 23	8 14 S.	α Hydræ (<i>Alphard</i>) ... 2-2	0 41	0 29	0 14	23 59	23 44	23 29	23 14	22 59	
10 3	12 26½ N.	α Leonis (<i>Regulus</i>) 1-4	1 21	1 10	0 54	0 39	0 24	0 9	23 54	23 39	
10 15	20 20 N.	γ¹ Leonis (<i>Algebra</i>) 2-5	1 33	1 21	1 6	0 51	0 36	0 21	0 6	23 51	
10 58	62 16½ N.	α Ursæ Majoris (<i>Dubhe</i>) 2-0	2 16	2 4	1 49	1 34	1 19	1 4	0 49	0 34	
11 9	21 4 N.	δ Leonis (<i>Zosma</i>) 2-8	2 27	2 16	2 0	1 45	1 30	1 15	1 0	0 45	
11 44	15 7 N.	β Leonis (<i>Denebola</i>) ... 2-2	3 2	2 51	2 35	2 20	2 5	1 50	1 35	1 20	
11 49	54 14 N.	γ Ursæ Majoris (<i>Phecda</i>) 2-6	3 7	2 55	2 40	2 25	2 10	1 55	1 40	1 25	
12 21	62 33½ S.	α¹ Crucis 1-0	3 39	3 28	3 12	2 57	2 42	2 27	2 12	1 57	
12 25	15 58 S.	δ² Corvi (<i>Algores</i>) 3-1	3 43	3 31	3 16	3 1	2 46	2 31	2 16	2 1	
12 29	22 51½ S.	β Corvi 2-8	3 48	3 36	3 21	3 5	2 50	2 35	2 20	2 5	
12 57	11 29 N.	ε Virginis (<i>Vindemiatrix</i>) 3-0	4 16	4 4	3 49	3 33	3 18	3 3	2 48	2 33	
13 20	10 39 S.	α Virginis (<i>Spica</i>) 1-2	4 38	4 27	4 11	3 56	3 41	3 26	3 11	2 56	
13 44	49 48 N.	η Ursæ Maj. (<i>Benetnasch</i>) 2-0	5 2	4 50	4 35	4 20	4 5	3 50	3 35	3 20	
13 57	59 54 S.	β Centauri 0-8	5 15	5 4	4 48	4 33	4 18	4 3	3 48	3 33	
14 11	19 41 N.	α Bootis (<i>Arcturus</i>) 0-3	5 29	5 18	5 2	4 47	4 32	4 17	4 2	3 47	
14 33	60 26 S.	α² Centauri 1-0	5 51	5 40	5 25	5 9	4 54	4 39	4 24	4 9	
14 45	15 38 S.	α Libræ 3-0	6 4	5 52	5 37	5 22	5 7	4 52	4 37	4 22	
15 12	9 1½ S.	β Libræ 2-7	6 30	6 18	6 3	5 48	5 33	5 18	5 3	4 48	
15 31	27 2½ N.	α Coronæ 2-4	6 49	6 37	6 22	6 7	5 52	5 37	5 22	5 7	
15 39	6 44 N.	α Serpentis (<i>Unukalhai</i>) 2-7	6 58	6 46	6 31	6 16	6 1	5 46	5 31	5 16	
16 0	19 32 S.	β¹ Scorpis (<i>Akrab</i>) 3-0	7 18	7 6	6 51	6 36	6 21	6 6	5 51	5 36	
16 23	26 13 S.	α Scorpis (<i>Antares</i>) 1-2	7 42	7 30	7 15	6 59	6 44	6 29	6 14	5 59	
16 38	31 47 N.	ζ Herculis 3-1	7 57	7 45	7 30	7 14	6 59	6 44	6 29	6 14	
16 38	68 51 S.	α Trianguli Australis ... 2-2	7 57	7 45	7 30	7 14	6 59	6 44	6 29	6 14	
17 5	15 36 S.	η Ophiuchi 2-6	8 23	8 11	7 56	7 41	7 26	7 11	6 56	6 41	
17 30	12 38 N.	α Ophiuchi (<i>Ras Alaghu</i>) 2-2	8 49	8 37	8 22	8 6	7 51	7 36	7 21	7 6	
17 54	51 30 N.	γ Draconis (<i>Etanin</i>) ... 2-4	9 13	9 1	8 46	8 30	8 15	8 0	7 45	7 30	
18 34	38 41½ N.	α Lyræ (<i>Vega</i>) 0-2	9 52	9 40	9 25	9 10	8 55	8 40	8 25	8 10	
19 46	8 37 N.	α Aquilæ (<i>Altair</i>) 1-0	11 4	10 53	10 37	10 22	10 7	9 52	9 37	9 22	
20 18	57 3 S.	α Pavonis 2-1	11 36	11 25	11 9	10 54	10 39	10 24	10 9	9 54	
20 38	44 56 N.	α Cygni (<i>Deneb</i>) 1-3	11 56	11 45	11 29	11 14	10 59	10 44	10 29	10 14	
21 16	62 10½ N.	α Cephei (<i>Allderamin</i>) 2-6	12 34	12 23	12 7	11 52	11 37	11 22	11 7	10 52	
22 2	47 26 S.	α Gruis 1-9	13 20	13 9	12 53	12 38	12 23	12 8	11 53	11 38	
22 52	30 8 S.	α Pis. Aust. (<i>Fomalhaut</i>) 1-3	14 10	13 59	13 43	13 28	13 13	12 58	12 43	12 28	
23 0	14 41 N.	α Pegasi (<i>Markab</i>) 2-6	14 18	14 6	13 51	13 36	13 21	13 6	12 51	12 36	

APPROXIMATE APPARENT TIME OF THE MERIDIAN PASSAGE OF THE PRINCIPAL FIXED STARS. *Daily change—4 minutes, nearly.*

STAR'S		SEPTEMBER.								
Right Ascension.	Declination.	Name and Magnitude.	1	4	8	12	16	20	24	28
<i>h. m.</i>	<i>°</i>		<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>
0 3	28 33 N.	α Andromedæ (<i>Alpheratz</i>) 2-1	13 25	13 14	13 0	12 45	12 31	12 17	12 3	11 48
0 8	14 38½ N.	γ Pegasi (<i>Algenib</i>) ... 3-0	13 30	13 19	13 5	12 50	12 36	12 22	12 7	11 53
0 35	56 0 N.	α Cassiopeiæ (<i>Schedir</i>) 2-5	13 57	13 46	13 32	13 17	13 3	12 49	12 34	12 20
0 39	18 31 S.	β Ceti (<i>Diphda</i>) 2-1	14 1	13 50	13 35	13 21	13 7	12 52	12 38	12 23
1 4	35 6½ N.	α Ceti (<i>Mirach</i>) 2-2	14 26	14 15	14 1	13 46	13 32	13 18	13 3	12 49
1 34	57 44 S.	α Eridani (<i>Achernar</i>) ... 1-0	14 56	14 45	14 31	14 16	14 2	13 48	13 33	13 19
2 2	23 0 N.	α Arietis (<i>Hamal</i>) 2-0	15 24	15 13	14 58	14 44	14 30	14 15	14 1	13 46
2 57	3 42½ N.	α Ceti (<i>Menkar</i>) 2-7	16 19	16 8	15 53	15 39	15 25	15 11	14 56	14 42
3 17	49 31 N.	α Persei 1-9	16 39	16 28	16 14	15 59	15 45	15 31	15 17	15 2
4 30	16 19 N.	α Tauri (<i>Aldebaran</i>) ... 1-0	17 52	17 41	17 27	17 12	16 58	16 44	16 30	16 15
5 9	45 54 N.	α Aurigæ (<i>Capella</i>) 0-2	18 31	18 21	18 6	17 52	17 37	17 23	17 9	16 54
5 10	8 19 S.	β Orionis (<i>Rigel</i>) 0-3	18 32	18 21	18 7	17 52	17 38	17 23	17 9	16 55
5 20	28 31½ N.	β Tauri (<i>El Nath</i>) 1-9	18 42	18 31	18 17	18 2	17 48	17 34	17 19	17 5
5 27	0 22 S.	δ Orionis (<i>Mintaka</i>) ... 2-5	18 49	18 38	18 24	18 9	17 55	17 41	17 26	17 12
5 31	1 16 S.	ϵ Orionis (<i>Abnilam</i>) ... 1-8	18 53	18 42	18 28	18 13	17 59	17 45	17 30	17 16
5 36	34 8 S.	α Columbæ 2-7	18 58	18 47	18 33	18 18	18 4	17 50	17 35	17 21
5 43	9 42 S.	κ Orionis (<i>Sayph</i>) 2-2	19 5	18 54	18 40	18 25	18 11	17 57	17 42	17 28
5 50	7 23 N.	α Orionis (<i>Betelgeuse</i>) ... 1-2	19 12	19 1	18 47	18 32	18 18	18 3	17 49	17 35
6 22	52 39 S.	α Argûs (<i>Canopus</i>) 0-4	19 44	19 33	19 18	19 4	18 50	18 35	18 21	18 7
6 41	16 35 S.	α Canis Maj. (<i>Sirius</i>) ... 1-4	20 3	19 52	19 38	19 23	19 9	18 54	18 40	18 26
6 55	28 50½ S.	ϵ Canis Majoris (<i>Adara</i>) 1-5	20 17	20 6	19 51	19 37	19 23	19 8	18 54	18 40
7 28	32 6 N.	α^2 Geminorum (<i>Castor</i>) 2-0	20 50	20 39	20 25	20 10	19 56	19 42	19 28	19 13
7 34	5 28½ N.	α Canis Min. (<i>Procyon</i>) 0-5	20 56	20 45	20 31	20 16	20 2	19 48	19 33	19 19
7 39	28 15½ N.	β Geminorum (<i>Pollux</i>) 1-2	21 1	20 50	20 36	20 21	20 7	19 53	19 39	19 24
9 14	58 52 S.	ϵ Argûs 2-2	22 36	22 26	22 11	21 57	21 42	21 28	21 14	20 59
9 23	8 14 S.	α Hydræ (<i>Alphard</i>) ... 2-2	22 45	22 34	22 19	22 5	21 51	21 36	21 22	21 8
10 3	12 26½ N.	α Leonis (<i>Regulus</i>) 1-4	23 25	23 14	23 0	22 45	22 31	22 17	22 2	21 48
10 15	20 20 N.	γ^1 Leonis (<i>Algeiba</i>) 2-5	23 37	23 26	23 11	22 57	22 43	22 28	22 14	21 59
10 58	62 16½ N.	α Ursæ Majoris (<i>Dubhe</i>) 2-0	0 20	0 9	23 54	23 40	23 26	23 11	22 57	22 43
11 9	21 4 N.	δ Leonis (<i>Zosma</i>) 2-8	0 31	0 20	0 6	23 51	23 37	23 23	23 8	22 54
11 44	15 7 N.	β Leonis (<i>Denebola</i>) 2-2	1 6	0 55	0 41	0 26	0 12	23 58	23 43	23 29
11 49	54 14 N.	γ Ursæ Majoris (<i>Phecda</i>) 2-6	1 11	1 0	0 45	0 31	0 17	0 2	23 48	23 34
12 21	62 33½ S.	α^1 Crucis 1-0	1 43	1 32	1 18	1 3	0 49	0 35	0 20	0 6
12 25	15 58 S.	δ^2 Corvi (<i>Algores</i>) 3-1	1 47	1 36	1 21	1 7	0 53	0 38	0 24	0 10
12 29	22 51½ S.	β Corvi 2-8	1 51	1 40	1 26	1 11	0 57	0 43	0 28	0 14
12 57	11 29 N.	ϵ Virginis (<i>Vindemiatrix</i>) 3-0	2 19	2 8	1 54	1 39	1 25	1 11	0 57	0 42
13 20	10 39 S.	α Virginis (<i>pica</i>) 1-2	2 42	2 31	2 17	2 2	1 48	1 34	1 19	1 5
13 44	49 48 N.	η Ursæ Maj. (<i>Benetnasch</i>) 2-0	3 6	2 55	2 40	2 26	2 12	1 57	1 43	1 29
13 57	59 54 S.	β Centauri 0-8	3 19	3 8	2 54	2 39	2 25	2 11	1 56	1 42
14 11	19 41 N.	α Bootis (<i>Arcturus</i>) 0-3	3 33	3 22	3 8	2 53	2 39	2 25	2 10	1 56
14 33	60 26 S.	α^2 Centauri 1-0	3 55	3 44	3 30	3 15	3 1	2 47	2 32	2 18
14 45	15 38 S.	α Libræ 3-0	4 7	3 57	3 42	3 27	3 13	2 59	2 45	2 30
15 12	9 1½ S.	β Libræ 2-7	4 34	4 23	4 8	3 54	3 40	3 25	3 11	2 57
15 31	27 2½ N.	α Coronæ 2-4	4 53	4 42	4 27	4 13	3 58	3 44	3 30	3 15
15 39	6 44 N.	α Serpentis (<i>Unukalhai</i>) 2-7	5 1	4 51	4 36	4 22	4 7	3 53	3 39	3 24
16 0	19 32 S.	β^1 Scorpil (<i>Akrab</i>) 3-0	5 22	5 11	4 56	4 42	4 28	4 13	3 59	3 45
16 23	26 13 S.	α Scorpil (<i>Antares</i>) 1-2	5 45	5 35	5 20	5 6	4 51	4 37	4 23	4 8
16 38	31 47 N.	ζ Herculis 3-1	6 0	5 49	5 35	5 20	5 6	4 52	4 38	4 23
16 38	68 51 S.	α Trianguli Australis ... 2-2	6 0	5 49	5 35	5 20	5 6	4 52	4 38	4 23
17 5	15 36 S.	η Ophiuchi 2-6	6 27	6 16	6 1	5 47	5 33	5 18	5 4	4 50
17 30	12 38 N.	α Ophiuchi (<i>Rasalaghuë</i>) 2-2	6 52	6 42	6 27	6 13	5 58	5 44	5 30	5 15
17 54	51 30 N.	γ Draconis (<i>Etanin</i>) 2-4	7 16	7 5	6 51	6 36	6 22	6 8	5 54	5 39
18 34	38 41½ N.	α Lyræ (<i>Vega</i>) 0-2	7 56	7 45	7 30	7 16	7 2	6 47	6 33	6 18
19 46	8 37 N.	α Aquilæ (<i>Altair</i>) 1-0	9 8	8 57	8 43	8 28	8 14	8 0	7 45	7 31
20 18	57 3 S.	α Pavonis 2-1	9 40	9 29	9 15	9 0	8 46	8 31	8 17	8 3
20 38	44 56 N.	α Cygni (<i>Deneb</i>) 1-3	10 0	9 49	9 35	9 20	9 6	8 52	8 37	8 23
21 16	62 10½ N.	α Cephei (<i>Alderamin</i>) 2-6	10 38	10 27	10 13	9 58	9 44	9 30	9 15	9 1
22 2	47 26 S.	α Gruis 1-9	11 24	11 13	10 59	10 44	10 30	10 16	10 1	9 47
22 52	30 8 S.	α Pis. Aust. (<i>Fomalhaut</i>) 1-3	12 14	12 3	11 49	11 34	11 20	11 6	10 51	10 37
23 0	14 41 N.	α Pegasi (<i>Markab</i>) 2-6	12 22	12 11	11 57	11 42	11 28	11 13	10 59	10 45

APPROXIMATE APPARENT TIME OF THE MERIDIAN PASSAGE OF THE PRINCIPAL FIXED STARS. Daily change—4 minutes, nearly.

STAR'S			OCTOBER.							
Right Ascension.	Declination.	Name and Magnitude.	1	4	8	12	16	20	24	28
h. m.	° ' "		h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
0 3	28 33 N.	α Andromedæ (<i>Alpheratz</i>) 2-1	11 37	11 26	11 12	10 57	10 42	10 27	10 12	9 57
0 8	14 38½ N.	γ Pegasi (<i>Algenib</i>) ... 3-0	11 42	11 31	11 17	11 2	10 47	10 32	10 17	10 2
0 35	56 0 N.	α Cassiopeizæ (<i>Schedir</i>) 2-5	12 9	11 58	11 43	11 29	11 14	10 59	10 44	10 29
0 39	18 31 S.	β Ceti (<i>Diphda</i>) ... 2-1	12 13	12 2	11 47	11 33	11 18	11 3	10 48	10 33
1 4	35 6½ N.	β Andromedæ (<i>Mirach</i>) 2-2	12 38	12 27	12 13	11 58	11 43	11 28	11 13	10 58
1 34	57 44 S.	α Eridani (<i>Achernar</i>) ... 1-0	13 8	12 57	12 43	12 28	12 13	11 58	11 43	11 28
2 2	23 0 N.	α Arietis (<i>Hamal</i>) ... 2-0	13 36	13 25	13 10	12 56	12 41	12 26	12 11	11 56
2 57	3 42½ N.	α Ceti (<i>Menkar</i>) ... 2-7	14 31	14 20	14 6	13 51	13 36	13 21	13 6	12 51
3 17	49 31 N.	α Persei ... 1-9	14 51	14 40	14 26	14 11	13 56	13 41	13 26	13 11
4 30	16 19 N.	α Tauri (<i>Aldebaran</i>) ... 1-0	16 4	15 53	15 39	15 24	15 9	14 54	14 39	14 24
5 9	45 54 N.	α Aurigæ (<i>Capella</i>) ... 0-2	16 43	16 33	16 18	16 4	15 49	15 34	15 19	15 4
5 10	8 19 S.	β Orionis (<i>Rigel</i>) ... 0-3	16 44	16 33	16 18	16 4	15 49	15 34	15 19	15 4
5 20	28 31½ N.	β Tauri (<i>El Nath</i>) ... 1-9	16 54	16 43	16 29	16 14	15 59	15 44	15 29	15 14
5 27	0 22 S.	δ Orionis (<i>Mintaka</i>) ... 2-5	17 1	16 50	16 36	16 21	16 6	15 51	15 36	15 21
5 31	1 16 S.	ε Orionis (<i>Alnilam</i>) ... 1-8	17 5	16 54	16 40	16 25	16 10	15 55	15 40	15 25
5 36	34 8 S.	α Columbæ ... 2-7	17 10	16 59	16 45	16 30	16 15	16 0	15 45	15 30
5 43	9 42 S.	κ Orionis (<i>Saiph</i>) ... 2-2	17 17	17 6	16 52	16 37	16 22	16 7	15 52	15 37
5 50	7 23 N.	α Orionis (<i>Betelgeuse</i>) ... 1-2	17 24	17 13	16 58	16 44	16 29	16 14	15 59	15 44
6 22	52 39 S.	α Argūs (<i>Canopus</i>) ... 0-4	17 56	17 45	17 30	17 16	17 1	16 46	16 31	16 16
6 41	16 35 S.	α Canis Maj. (<i>Sirius</i>) ... 1-4	18 15	18 4	17 49	17 35	17 20	17 5	16 50	16 35
6 55	28 50½ S.	ε Canis Majoris (<i>Adara</i>) 1-5	18 29	18 18	18 3	17 49	17 34	17 19	17 4	16 49
7 28	32 6 N.	α² Geminorum (<i>Castor</i>) 2-0	19 2	18 51	18 37	18 22	18 7	17 52	17 37	17 22
7 34	5 28½ N.	α Canis Min. (<i>Procyon</i>) 0-5	19 8	18 57	18 43	18 28	18 13	17 58	17 43	17 28
7 39	28 15½ N.	β Geminorum (<i>Pollux</i>) 1-2	19 13	19 2	18 48	18 33	18 18	18 3	17 48	17 33
9 14	58 52 S.	ι Argūs ... 2 2	20 48	20 38	20 23	20 9	19 54	19 39	19 24	19 9
9 23	8 14 S.	α Hydræ (<i>Alphard</i>) ... 2-2	20 57	20 46	20 31	20 17	20 2	19 47	19 32	19 17
10 3	12 26½ N.	α Leonis (<i>Regulus</i>) ... 1-4	21 37	21 26	21 12	20 57	20 42	20 27	20 12	19 57
10 15	20 20 N.	γ¹ Leonis (<i>Algebra</i>) ... 2-5	21 49	21 38	21 23	21 9	20 54	20 39	20 24	20 9
10 58	62 16½ N.	α Ursæ Majoris (<i>Dubhe</i>) 2-0	22 32	22 21	22 6	21 52	21 37	21 22	21 7	20 52
11 9	21 4 N.	δ Leonis (<i>Zosma</i>) ... 2-8	22 43	22 33	22 18	22 3	21 48	21 33	21 18	21 3
11 44	15 7 N.	β Leonis (<i>Denebola</i>) ... 2-2	23 18	23 7	22 53	22 38	22 23	22 8	21 53	21 38
11 49	54 14 N.	γ Ursæ Majoris (<i>Phecda</i>) 2-6	23 23	23 12	22 57	22 43	22 28	22 13	21 58	21 43
12 21	62 33½ S.	α¹ Crucis ... 1-0	23 55	23 44	23 30	23 15	23 0	22 45	22 30	22 15
12 25	15 58 S.	δ² Corvi (<i>Algores</i>) ... 3-1	23 59	23 48	23 33	23 19	23 4	22 49	22 34	22 19
12 29	22 51½ S.	β Corvi ... 2-8	0 3	23 52	23 38	23 23	23 8	22 53	22 38	22 23
12 57	11 29 N.	ε Virginis (<i>Vindemiatrix</i>) 3-0	0 31	0 20	0 6	23 51	23 36	23 21	23 6	22 51
13 20	10 39 S.	α Virginis (<i>Spica</i>) ... 1-2	0 54	0 43	0 29	0 14	23 59	23 44	23 29	23 14
13 44	49 48 N.	η Ursæ Maj. (<i>Benetnasch</i>) 2-0	1 18	1 7	0 52	0 38	0 23	0 8	23 53	23 38
13 57	59 54 S.	β Centauri ... 0-8	1 31	1 20	1 5	0 51	0 36	0 21	0 6	23 51
14 11	19 41 N.	α Boötis (<i>Arcturus</i>) ... 0-3	1 45	1 34	1 20	1 5	0 50	0 35	0 20	0 5
14 33	60 26 S.	α² Centauri ... 1-0	2 7	1 56	1 42	1 27	1 12	0 57	0 42	0 27
14 45	15 38 S.	α Libræ ... 3-0	2 19	2 9	1 54	1 40	1 25	1 10	0 55	0 40
15 12	9 1½ S.	β Libræ ... 2-7	2 46	2 35	2 20	2 6	1 51	1 36	1 21	1 6
15 31	27 2½ N.	α Coronæ ... 2-4	3 5	3 5	2 39	2 25	2 10	1 55	1 40	1 25
15 39	6 44 N.	α Serpentis (<i>Unukalhai</i>) 2-7	3 13	3 3	2 48	2 34	2 19	2 4	1 49	1 34
16 0	19 32 S.	β¹ Scorpii (<i>Akrab</i>) ... 3-0	3 34	3 23	3 8	2 54	2 39	2 24	2 9	1 54
16 23	26 13 S.	α Scorpii (<i>Antares</i>) ... 1-2	3 57	3 47	3 32	3 17	3 2	2 47	2 32	2 17
16 38	31 47 N.	ζ Herculis ... 3-1	4 12	4 1	3 47	3 32	3 17	3 2	2 47	2 32
16 38	68 51 S.	α Trianguli Australis ... 2-2	4 12	4 1	3 47	3 32	3 17	3 2	2 47	2 32
17 5	15 36 S.	η Ophiuchi ... 2-6	4 39	4 28	4 13	3 59	3 44	3 29	3 14	2 59
17 30	12 38 N.	α Ophiuchi (<i>Ras Alaghu</i>) 2-2	5 4	4 54	4 39	4 24	4 9	3 54	3 39	3 24
17 54	51 30 N.	γ Draconis (<i>Etanin</i>) ... 2-4	5 28	5 17	5 3	4 48	4 33	4 18	4 3	3 48
18 34	38 41½ N.	α Lyræ (<i>Vega</i>) ... 0-2	6 8	5 57	5 42	5 28	5 13	4 58	4 43	4 28
19 46	8 37 N.	α Aquilæ (<i>Altair</i>) ... 1-0	7 20	7 9	6 55	6 40	6 25	6 10	5 55	5 40
20 18	57 3 S.	α Pavonis ... 2-1	7 52	7 41	7 26	7 12	6 57	6 42	6 27	6 12
20 38	44 56 N.	α Cygni (<i>Deneb</i>) ... 1-3	8 12	8 1	7 47	7 32	7 17	7 2	6 47	6 32
21 16	62 10½ N.	α Cephei (<i>Alderamin</i>) 2-6	8 50	8 39	8 25	8 10	7 55	7 40	7 25	7 10
22 2	47 26 S.	α Gruis ... 1-9	9 36	9 25	9 11	8 56	8 41	8 26	8 11	7 56
22 52	30 8 S.	α Pis. Aust. (<i>Fomalhaut</i>) 1-3	10 26	10 15	10 1	9 46	9 31	9 16	9 1	8 46
23 0	14 41 N.	α Pegasi (<i>Markab</i>) ... 2-6	10 34	10 23	10 8	9 54	9 39	9 24	9 9	8 54

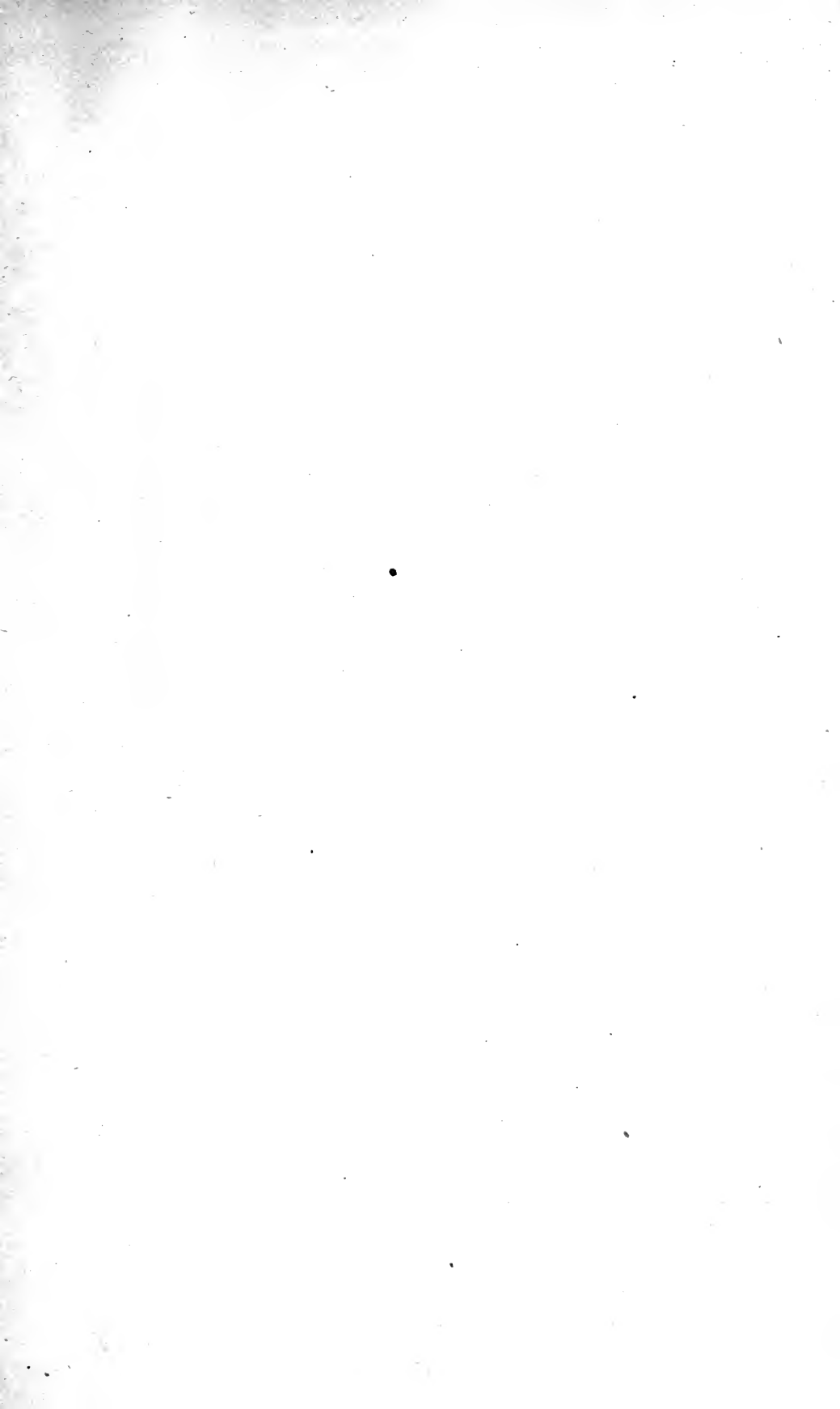
APPROXIMATE APPARENT TIME OF THE MERIDIAN PASSAGE OF THE PRINCIPAL FIXED STARS. *Daily change—4 minutes, nearly.*

STAR'S			NOVEMBER.							
Right Ascension.	Declination.	Name and Magnitude.	1	4	8	12	16	20	24	28
<i>h. m.</i>	<i>° ' "</i>		<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>
0 3	28 33 N.	α Andromedæ (<i>Alpheratz</i>) 2-1	9 41	9 30	9 14	8 57	8 41	8 25	8 8	7 51
0 8	14 38½ N.	γ Pegasi (<i>Algenib</i>) ... 3-0	9 46	9 34	9 19	9 2	8 46	8 30	8 13	7 56
0 35	56 0 N.	α Cassiopeidæ (<i>Schedir</i>) 2-5	10 13	10 1	9 45	9 29	9 13	8 56	8 40	8 23
0 39	18 31 S.	β Ceti (<i>Diphda</i>) 2-1	10 17	10 5	9 49	9 33	9 17	9 0	8 43	8 26
1 4	35 6½ N.	β Andromedæ (<i>Mirach</i>) 2-2	10 42	10 31	10 15	9 58	9 42	9 26	9 9	8 52
1 34	57 44 S.	α Eridani (<i>Achernar</i>) ... 1-0	11 12	11 0	10 45	10 28	10 12	9 55	9 39	9 22
2 2	23 0 N.	α Arietis (<i>Hamal</i>) 2-0	11 40	11 28	11 12	10 56	10 40	10 23	10 6	9 49
2 57	3 42½ N.	α Ceti (<i>Menkar</i>) 2-7	12 35	12 23	12 8	11 52	11 35	11 19	11 2	10 45
3 17	49 31 N.	α Persei 1-9	12 55	12 44	12 28	12 12	11 55	11 39	11 22	11 5
4 30	16 19 N.	α Tauri (<i>Aldebaran</i>) ... 1-0	14 8	13 57	13 41	13 25	13 8	12 52	12 35	12 18
5 9	45 54 N.	α Aurigæ (<i>Capella</i>) 0-2	14 48	14 36	14 20	14 4	13 47	13 31	13 14	12 57
5 10	8 19 S.	β Orionis (<i>Rigel</i>) 0-3	14 48	14 36	14 20	14 4	13 48	13 31	13 15	12 57
5 20	28 31½ N.	β Tauri (<i>El Nath</i>) 1-9	14 58	14 46	14 31	14 14	13 58	13 41	13 25	13 8
5 27	0 22 S.	δ Orionis (<i>Mintaka</i>) ... 2-5	15 5	14 53	14 37	14 21	14 5	13 48	13 32	13 15
5 31	1 16 S.	ϵ Orionis (<i>Alnilam</i>) ... 1-8	15 9	14 58	14 42	14 26	14 9	13 53	13 36	13 19
5 36	34 8 S.	α Columbæ 2-7	15 14	15 2	14 47	14 31	14 14	13 57	13 41	13 24
5 43	9 42 S.	κ Orionis (<i>Saiph</i>) 2-2	15 21	15 9	14 54	14 38	14 21	14 4	13 48	13 31
5 50	7 23 N.	α Orionis (<i>Betelgeuse</i>) ... 1-2	15 28	15 16	15 0	14 44	14 28	14 11	13 55	13 38
6 22	52 39 S.	α Argûs (<i>Canopus</i>) 0-4	16 0	15 48	15 32	15 16	15 0	14 43	14 27	14 10
6 41	16 35 S.	α Canis Maj. (<i>Sirius</i>) - 1-4	16 19	16 7	15 51	15 35	15 19	15 2	14 45	14 28
6 55	28 50½ S.	ϵ Canis Majoris (<i>Adara</i>) 1-5	16 33	16 21	16 5	15 49	15 33	15 16	14 59	14 42
7 28	32 6 N.	α^2 Geminorum (<i>Castor</i>) 2-0	17 6	16 55	16 39	16 23	16 6	15 50	15 33	15 16
7 34	5 28½ N.	α Canis Min. (<i>Procyon</i>) 0-5	17 12	17 1	16 45	16 29	16 12	15 56	15 39	15 22
7 39	28 15½ N.	β Geminorum (<i>Pollux</i>) 1-2	17 17	17 6	16 50	16 34	16 17	16 1	15 44	15 27
9 14	58 52 S.	ϵ Argûs 2-2	18 53	18 41	18 25	18 9	17 52	17 36	17 19	17 2
9 23	8 14 S.	α Hydræ (<i>Alphard</i>) ... 2-2	19 1	18 49	18 33	18 17	18 0	17 44	17 27	17 10
10 3	12 26½ N.	α Leonis (<i>Regulus</i>) 1-4	19 41	19 29	19 13	18 57	18 41	18 25	18 8	17 51
10 15	20 20 N.	γ^1 Leonis (<i>Algeiba</i>) 2-5	19 53	19 41	19 25	19 9	18 53	18 36	18 19	18 2
10 58	62 16½ N.	α Ursæ Majoris (<i>Dubhe</i>) 2-0	20 36	20 24	20 8	19 52	16 36	19 19	19 2	18 45
11 9	21 4 N.	δ Leonis (<i>Zosma</i>) 2-8	20 47	20 35	20 19	20 3	19 47	19 30	19 13	18 56
11 44	15 7 N.	β Leonis (<i>Denebola</i>) ... 2-2	21 22	21 10	20 54	20 38	20 22	20 5	19 49	19 32
11 49	54 14 N.	γ Ursæ Majoris (<i>Phecda</i>) 2-6	21 27	21 15	20 59	20 43	20 27	20 10	19 53	19 37
12 21	62 33½ S.	α^1 Crucis 1-0	21 59	21 47	21 32	21 16	20 59	20 43	20 26	20 9
12 25	15 58 S.	δ^2 Corvi (<i>Algores</i>) 3-1	22 3	21 51	21 35	21 19	21 3	20 46	20 30	20 13
12 29	22 51½ S.	β Corvi 2-8	22 7	21 56	21 40	21 24	21 7	20 51	20 34	20 17
12 57	11 29 N.	ϵ Virginis (<i>Vindemiatrix</i>) 3-0	22 35	22 24	22 8	21 52	21 35	21 19	21 2	20 45
13 20	10 39 S.	α Virginis (<i>Spica</i>) 1-2	22 58	22 46	22 30	22 14	21 58	21 41	21 25	21 8
13 44	49 48 N.	η Ursæ Maj. (<i>Benetnasch</i>) 2-0	23 22	23 10	22 54	22 38	22 22	22 5	21 48	21 31
13 57	59 54 S.	β Centauri 0-8	23 35	23 23	23 7	22 51	22 35	22 18	22 2	21 45
14 11	19 41 N.	α Boötis (<i>Arcturus</i>) 0-3	23 49	23 38	23 22	23 6	22 49	22 33	22 16	21 59
14 33	60 26 S.	α^2 Centauri 1-0	0 11	23 59	23 44	23 27	23 11	22 54	22 38	22 21
14 45	15 38 S.	α Libræ 3-0	0 24	0 12	23 56	23 40	23 23	23 7	22 50	22 33
15 12	9 1½ S.	β Libræ 2-7	0 50	0 38	0 22	0 6	23 50	23 33	23 16	22 59
15 31	27 2½ N.	α Coronæ 2-4	1 9	0 57	0 41	0 25	0 9	23 52	23 35	23 18
15 39	6 44 N.	α Serpentis (<i>Unukalhai</i>) 2-7	1 18	1 6	0 50	0 34	0 17	0 1	23 44	23 27
16 0	19 32 S.	β^1 Scorpii (<i>Akrab</i>) 3-0	1 38	1 26	1 10	0 54	0 38	0 21	0 4	23 47
16 23	26 13 S.	α Scorpii (<i>Antares</i>) 1-2	2 2	1 50	1 34	1 18	1 1	0 45	0 28	0 11
16 38	31 47 N.	ζ Herculis 3-1	2 16	2 5	1 49	1 33	1 16	1 0	0 43	0 26
16 38	68 51 S.	α Trianguli Australis ... 2-2	2 16	2 5	1 49	1 33	1 16	1 0	0 43	0 26
17 5	15 36 S.	η Ophiuchi 2-6	2 43	2 31	2 15	1 59	1 43	1 26	1 9	0 52
17 30	12 38 N.	α Ophiuchi (<i>Rasalaghuë</i>) 2-2	3 8	2 57	2 41	2 25	2 8	1 52	1 35	1 18
17 54	51 30 N.	γ Draconis (<i>Etanin</i>) ... 2-4	3 32	3 21	3 5	2 49	2 32	2 16	1 59	1 42
18 34	38 41½ N.	α Lyræ (<i>Vega</i>) 0-2	4 12	4 0	3 44	3 28	3 12	2 55	2 38	2 21
19 46	8 37 N.	α Aquilæ (<i>Altair</i>) 1-0	5 24	5 12	4 56	4 40	4 24	4 7	3 51	3 34
20 18	57 3 S.	α Pavonis 2-1	5 56	5 44	5 28	5 12	4 56	4 39	4 23	4 6
20 38	44 56 N.	α Cygni (<i>Deneb</i>) 1-3	6 16	6 4	5 48	5 32	5 16	4 59	4 43	4 26
21 16	62 10½ N.	α Cephei (<i>Alderamin</i>) 2-6	6 54	6 43	6 27	6 10	5 54	5 38	5 21	5 4
22 2	47 26 S.	α Gruis 1-9	7 40	7 28	7 12	6 56	6 40	6 23	6 7	5 50
22 52	30 8 S.	α Pis. Aust. (<i>Fomalhaut</i>) 1-3	8 30	8 19	8 3	7 46	7 30	7 14	6 57	6 40
23 0	14 41 N.	α Pegasi (<i>Markab</i>) 2-6	8 38	8 26	8 10	7 54	7 38	7 21	7 5	6 48

APPROXIMATE APPARENT TIME OF THE MERIDIAN PASSAGE OF THE PRINCIPAL FIXED STARS. *Daily change—4 minutes, nearly.*

STAR'S			DECEMBER.							
Right Ascension.	Declination.	Name and Magnitude.	1	4	8	12	16	20	24	28
<i>h. m.</i>			<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>
0 3	28 33 N.	α Andromedæ (<i>Alpheratz</i>) 2-1	7 38	7 25	7 8	6 50	6 32	6 15	5 57	5 39
0 8	14 38½ N.	γ Pegasi (<i>Algenib</i>) 3-0	7 43	7 30	7 13	6 55	6 37	6 19	6 2	5 44
0 35	56 0 N.	α Cassiopeiæ (<i>Schedir</i>) 2-5	8 10	7 57	7 40	7 22	7 4	6 46	6 28	6 11
0 39	18 31 S.	β Ceti (<i>Diphda</i>) 2-1	8 13	8 0	7 43	7 26	7 8	6 50	6 32	6 15
1 4	35 6½ N.	β Andromedæ (<i>Mirach</i>) 2-1	8 39	8 26	8 9	7 51	7 33	7 16	6 58	6 40
1 34	57 44 S.	α Eridani (<i>Achernar</i>) .. 1-0	9 9	8 56	8 38	8 21	8 3	7 45	7 28	7 10
2 2	23 0 N.	α Arietis (<i>Hamal</i>) 2-0	9 36	9 23	9 6	8 48	8 30	8 13	7 55	7 37
2 57	3 42½ N.	α Ceti (<i>Menkar</i>) 2-7	10 32	10 19	10 1	9 44	9 26	9 8	8 51	8 33
3 17	49 31 N.	α Persei 1-9	10 52	10 39	10 22	10 4	9 46	9 29	9 11	8 53
4 30	16 19 N.	α Tauri (<i>Aldebaran</i>) ... 1-0	12 5	11 52	11 35	11 17	11 0	10 42	10 25	10 7
5 9	45 54 N.	α Aurigæ (<i>Capella</i>) 0-2	12 44	12 31	12 14	11 56	11 39	11 21	11 3	10 45
5 10	8 19 S.	β Orionis (<i>Rigel</i>) 0-3	12 45	12 32	12 14	11 56	11 39	11 21	11 3	10 46
5 20	28 31½ N.	β Tauri (<i>El Nath</i>) 1-9	12 55	12 42	12 24	12 6	11 49	11 31	11 13	10 56
5 27	0 22 S.	δ Orionis (<i>Mintaka</i>) ... 2-5	13 2	12 49	12 31	12 13	11 56	11 38	11 20	11 3
5 31	1 16 S.	ε Orionis (<i>Alnilam</i>) ... 1-8	13 6	12 53	12 36	12 18	12 0	11 43	11 25	11 7
5 36	34 8 S.	α Columbæ 2-7	13 11	12 58	12 40	12 23	12 5	11 47	11 30	11 12
5 43	9 42 S.	κ Orionis (<i>Saiph</i>) 2-2	13 18	13 5	12 47	12 30	12 12	11 54	11 37	11 19
5 50	7 23 N.	α Orionis (<i>Betelgeuse</i>) .. 1-2	13 25	13 12	12 54	12 37	12 19	12 1	11 44	11 26
6 22	52 39 S.	α Argûs (<i>Canopus</i>) 0-4	13 56	13 44	13 26	13 9	12 51	12 33	12 15	11 58
6 41	16 35 S.	α Canis Maj. (<i>Sirius</i>) ... 1-4	14 16	14 3	13 45	13 28	13 10	12 52	12 34	12 17
6 55	28 50½ S.	ε Canis Majoris (<i>Adara</i>) 1-5	14 29	14 17	13 59	13 42	13 24	13 6	12 48	12 31
7 28	32 6 N.	α² Geminorum (<i>Castor</i>) 2-0	15 3	14 50	14 33	14 15	13 57	13 40	13 22	13 4
7 34	5 28½ N.	α Canis Min. (<i>Procyon</i>) 0-5	15 9	14 56	14 38	14 21	14 3	13 46	13 28	13 10
7 39	28 15½ S.	β Geminorum (<i>Pollux</i>) 1-2	15 14	15 1	14 44	14 26	14 8	13 51	13 33	13 15
9 14	58 52 S.	ε Argûs 2-2	16 49	16 36	16 19	16 1	15 44	15 26	15 8	14 50
9 23	8 14 S.	α Hydræ (<i>Alphard</i>) ... 2-2	16 57	16 45	16 27	16 9	15 52	15 34	15 16	14 58
10 3	12 26½ N.	α Leonis (<i>Regulus</i>) 1-4	17 38	17 25	17 7	16 50	16 32	16 14	15 56	15 39
10 15	20 20 N.	γ¹ Leonis (<i>Algeiba</i>) ... 2-5	17 49	17 36	17 19	17 1	16 44	16 26	16 8	15 50
10 58	62 16½ N.	α Ursæ Majoris (<i>Dubhe</i>) 2-0	18 32	18 19	18 2	17 44	17 27	17 9	16 51	16 33
11 9	21 4 N.	δ Leonis (<i>Zosma</i>) 2-8	18 44	18 31	18 13	17 55	17 38	17 20	17 2	16 44
11 44	15 7 N.	β Leonis (<i>Denebola</i>) ... 2-2	19 19	19 6	18 48	18 30	18 13	17 55	17 37	17 19
11 49	54 14 N.	γ Ursæ Majoris (<i>Phecda</i>) 2-6	19 23	19 10	18 53	18 35	18 18	18 0	17 42	17 24
12 21	62 33½ S.	α¹ Crucis 1-0	19 56	19 43	19 25	19 8	18 50	18 32	18 15	17 57
12 25	15 58 S.	δ² Corvi (<i>Algores</i>) 3-1	20 0	19 47	19 29	19 12	18 54	18 36	18 19	18 1
12 29	22 51½ S.	β Corvi 2-8	20 4	19 51	19 34	19 16	18 58	18 41	18 23	18 5
12 57	11 29 N.	ε Virginis (<i>Vindemiatrix</i>) 3-0	20 32	20 19	20 2	19 44	19 26	19 9	18 51	18 33
13 20	10 39 S.	α Virginis (<i>Spica</i>) 1-2	20 55	20 42	20 24	20 7	19 49	19 31	19 14	18 56
13 44	49 48 N.	η Ursæ Maj. (<i>Benetnasch</i>) 2-0	21 18	21 5	20 48	20 31	20 13	19 55	19 37	19 19
13 57	59 54 S.	β Centauri 0-8	21 32	21 19	21 1	20 44	20 26	20 8	19 50	19 33
14 11	19 41 N.	α Bootis (<i>Arcturus</i>) 0-3	21 46	21 33	21 16	20 58	20 40	20 23	20 5	19 47
14 33	60 26 S.	α² Centauri 1-0	22 8	21 55	21 37	21 20	21 2	20 44	20 27	20 9
14 45	15 38 S.	α Libræ 3-0	22 20	22 7	21 50	21 32	21 15	20 57	20 39	20 21
15 12	9 1½ S.	β Libræ 2-7	22 46	22 34	22 16	21 58	21 41	21 23	21 5	20 48
15 31	27 2½ N.	α Coronæ 2-4	23 5	22 52	22 35	22 17	22 0	21 42	21 24	21 6
15 39	6 44 N.	α Serpentis (<i>Unukalhai</i>) 2-7	23 14	23 1	22 44	22 26	22 9	21 51	21 33	21 15
16 0	19 32 S.	β¹ Scorpii (<i>Akrab</i>) 3-0	23 34	23 22	23 4	22 46	22 29	22 11	21 53	21 35
16 23	26 13 S.	α Scorpii (<i>Antares</i>) 1-2	23 58	23 46	23 28	23 10	22 53	22 35	22 17	21 59
16 38	31 47 N.	ζ Herculis 3-1	0 13	0 0	23 43	23 25	23 7	22 50	22 32	22 14
16 38	68 51 S.	α Trianguli Australis ... 2-2	0 13	0 0	23 43	23 25	23 7	22 50	22 32	22 14
17 5	15 36 S.	η Ophiuchi 2-6	0 39	0 27	0 9	23 52	23 34	23 16	22 58	22 41
17 30	12 38 N.	α Ophiuchi (<i>Rasalaghuë</i>) 2-2	1 5	0 52	0 35	0 17	23 59	23 42	23 24	23 6
17 54	51 30 N.	γ Draconis (<i>Etanin</i>) ... 2-4	1 29	1 16	0 59	0 41	0 24	0 6	23 48	23 30
18 34	38 41½ N.	α Lyræ (<i>Vega</i>) 0-2	2 8	1 55	1 38	1 20	1 3	0 45	0 27	0 9
19 46	8 37 N.	α Aquilæ (<i>Altair</i>) 1-0	3 21	3 8	2 50	2 33	2 15	1 57	1 39	1 21
20 18	57 3 S.	α Pavonis 2-1	3 53	3 40	3 22	3 5	2 47	2 29	2 11	1 53
20 38	44 56 N.	α Cygni (<i>Deneb</i>) 1-3	4 13	4 0	3 42	3 25	3 7	2 49	2 32	2 14
21 16	62 10½ N.	α Cephei (<i>Alderamin</i>) 2-6	4 51	4 38	4 21	4 4	3 46	3 28	3 10	2 52
22 2	47 26 S.	α Gruis 1-9	5 37	5 24	5 6	4 49	4 31	4 13	3 56	3 38
22 52	30 8 S.	α Pis. Aust. (<i>Fomalhaut</i>) 1-3	6 27	6 14	5 57	5 39	5 21	5 4	4 46	4 28
23 0	14 41 N.	α Pegasi (<i>Markab</i>) 2-6	6 35	6 22	6 4	5 47	5 29	5 11	4 54	4 36

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